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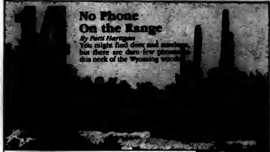

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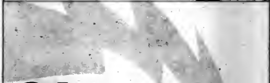

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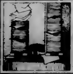

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EDITORIAL

Even Scrooge Had His Good Points

It has become quite fashionable of late to criticize AT&T. The divested telephone giant has been accused of many heinous acts and, in some cases, rightfully so.

Given its druthers, the former Ma Bell would have never agreed to divest itself without government intervention and, even now, would love to regain its monopoly over the nation's telephone network.

That being the case, it is wise to maintain a somewhat jaundiced eye when dealing with the company.

However, even Ebenezer Scrooge had his good points. Like AT&T, he just had to be divested of his bad ones. That brings us around to a sympathetic word or two.

At the outset of the recent 23rd Olympiad in Los Angeles, foreign reporters created an international brouhaha when they were unable to secure long-distance links back to their respective countries. The villain and whipping boy was, of course, AT&T.

The phone company was placed on the world stage and ostracized for perpetrating yet another outrage against innocent, unsuspecting phone users. But somehow, nobody got around to calling AT&T for its explanation of the situation. This is what we in journalism refer to as bad reporting.

As it turned out, AT&T and Pacific Bell were putting out Olympian efforts of their own in trying to dismantle the hookups serving the Democratic National Convention at the same time they were attempting to set up 525 special long-distance circuits for the Los Angeles Games.

It should be noted that nobody castigated Pacific Bell.

On another Olympic front, AT&T deserves praise for putting together and operating a successful electronic mail system for use by reporters at the Games. The system, which performed a number of useful tasks, ranging from giving event results to providing communications between reporters, was easy to learn and well-supported by AT&T personnel.

Even when the messaging component of the electronic mail system went down, which was rare, it still provided event results and schedules.

On another front, despite the fact that its private-line orders are falling further into arrears, AT&T managed a slight improvement in filling those orders in July, completing 29.1% of all orders for that month, as opposed to 22.8% in June.

So here's to AT&T. Even the perfect villain can't be perfect all the time.

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On Communications

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DIALOGUE

What role will cable television play in the future of data communications?

Daniel Grove, telecommunications manager, Motorola, Inc., Phoenix:

"My feeling is that the cable companies have a long way to go before they are in a position to provide viable data communications services. The problem is that they are not actually pursuing this market. They have data communications capability in many installations with their institutional cable.

"I am not convinced that they see that much of a potential market for data communications services. Maybe in a couple of years they will realize they have a capability in this area and go after it.

"A problem that cable companies must address is the interconnectability of one cable system to another. This will present a huge problem that must be solved before cable companies can provide viable business services.

"Cable companies are knowledgeable about the residential entertainment market, and that is the market they are going after. Maybe after they get the residential market established they will start looking at the business market. We have talked to cable companies in the past about data communications. While they express interest and they have the capability, they really have not shown any aggressiveness at all in going after business data communications.

"In the Phoenix market, what is holding up the cable company is that it is devoting all its energy to the construction of the residential system. As it wires each new neighborhood, it sells to that market to increase its residential cable penetration."

David Chapman, communications manager, University of California at Santa Barbara, Santa Barbara, Calif.:

"Because of the bandwidth capacity of CATV systems, there is enormous potential to use them for high-speed data transmission. This depends on whether the CATV companies, the Federal Communications Commission and the telephone companies can come to a mutual agreement on competition in this arena. This should be an interesting fight to watch.

"I think that campuses and large corporations with dispersed locations will be the first to make effective use of CATV systems for data communications. We have a new broadband system on campus that is tailor-made to lock right into the CATV system. What prevents us from hooking up are the legal and financial logjams the cable companies are running into."

Paul Padilla, data processing director, Public Service Co. of New Mexico, Albuquerque, N.M.:

"Cable systems could be used successfully for data communications. This method appears to be a viable approach to moving data within a city. We are interested in trying to set up such a data communications network locally for businesses and universities.

"There is currently a very high cost for moving data at high data rates when using normal common carriers; CATV would reduce the cost for this. The highest cost involved would probably be for the initial hookup to the cable system. You could move data rapidly and at a lower cost.

"However, it is not clear whether CATV companies are going to be allowed to offer these services. There has been no ruling on whether cable systems can move data through those channels. The phone companies are saying that they are being limited in the data communications services they can offer. Why shouldn't the cable companies be limited as to what services they can provide?"

R.K. Wittenberg, data center director, San Diego Data Processing Corp., San Diego:

"We are in the process of implementing a library circulation system for branch libraries scattered all over the county of San Diego. The land line costs for this range from the ridiculous to the exorbitant.

"We looked at the possibility of using part of San Diego's cable television system as a data communications transmission medium, but it only had two-way capability in a limited area. When it expands the two-way system, use of the system would be advantageous, because its cable runs past many of the libraries that we want to connect.

"A CATV system can be a cost-effective method of transmitting data to remote sites. However, our dreams and the capabilities of the cable plant just do not agree now."

Hector Myerson, senior telecommunications analyst, Stanford Research Institute International, Menlo Park, Calif.:

"My opinion is that most CATV companies do not have the technology to give you a good steady television picture, much less a data communications capability. The internal management of local CATV companies does not inspire my confidence. Most of the CATV networks are badly designed and overexpanded, as far as I can see.

"In Palo Alto, the local telephone company is making a bid for the CATV franchise. It is thinking of wiring the system with fiber-optic cable and then making the excess bandwidth capacity available to businesses.

"If the local operating company will give you a fiber-optic capacity between one point and a remote site, that is different from the CATV company giving you a coaxial cable connection between the same two points."

John D. Lockton Jr., executive marketing vice-president, Pacific Bell, San Francisco:

"CATV systems will play a major role. A popular tendency today is to say that cable has missed its future in data communications, but I disagree. The American home is used to receiving much of its data combined with video, and coaxial cable will continue to be the best means of transporting combined video and data services to the home for many years to come.

"This is not to say cable has a substantial future in business data communications. Lack of technological depth and necessary marketing capabilities have impeded cable's dream of becoming the darling of telephone company bypass.

"Left to the home, cable has the opportunity to bring the information age to America. But cable cannot do it alone. A partnering of cable companies and telephone companies makes possible low-cost information access through a marriage of the telephone and the television set."

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LETTERS

Call It Misleading

In regard to Ms. Wainwright's comment in the article "Call It Telethievery" [On Communications, July 4], that "people have to start treating these cards as credit cards," I have to wonder what AT&T was thinking when it decided several years ago to rename its Telephone Credit Card the Telephone Calling Card. It would seem that AT&T is partially responsible for the public's cavalier attitude toward this payment mechanism, since it has confused the public's perception of what that piece of plastic really is.

Kenneth R. Jongsma
Senior Engineer
GTE Corp.
Westboro, Mass.

On Communications welcomes letters from its readers. Letters should be typed, double-spaced and no longer than 150 words. They should be addressed to *Editor, Computerworld On Communications, 375 Cochituate Road, Box 880, Framingham, Mass. 01701.*

PRO & CON

Should CATV Move Data Down the Pipes?

Traditionally, cable television systems have offered only home television service. However, like many communications services, CATV is undergoing a facelift in the dynamic post-divestiture world.

The two key words to consider here are broadband *and* bypass. *Because cable systems run over broadband coaxial cable, they can bypass the local telephone companies. Conceivably, the cable firms could offer voice, data and video transmission services in addition to home television.*

Local telephone companies, most prominently the spun-off Bell operating companies, do not look fondly upon bypass in any form, and many new forms are proliferating. Local communications distribution has been the exclusive bailiwick of the operating companies, and now they are feeling the pinch of competition.

The courts, public utility commissions and Congress are considering letting cable companies pump data through their metropolitan networks. The operating companies object. Here are their points of view.

TOM BARRETT

PRO

By Gustave M. Hauser

For more than three decades, local telephone operating companies, operating virtually without competition in their service areas, have sought to block the entry of cable companies into nonentertainment or nonvideo wireline telecommunications services.

This involves services, such as two-way data transmission, that fall between the point-to-multipoint video services traditional to cable and the switched voice services traditional to the telephone industry.

Cable has never sought to offer switched voice service. Regional Bell operating companies and other local telephone companies contend that allowing cable operators to provide alternative services under regulatory treatment different from that affecting monopoly telephone companies would establish an unfair competitive advantage for cable.

In the past year, telephone companies in numerous states have sought the protection of state regulatory authorities from competition by unregulated entities in the provision of alternative services. They have managed to encourage regulators in several states to initiate proceedings to determine whether and under what conditions cable systems will be allowed to offer alternative services in competition with the telephone companies.

Since the provision of alternative services by cable operators is largely theoretical today, the goal of the telephone companies has been the harnessing of nascent or potential competition with burdensome regulatory constraints appropriate for monopolistic telephone companies.

Alternatively, they have sought to assure a "level playing field" through deregulation of their own activities, despite the fact that the telephone companies operate under virtual monopoly conditions. Cable competition is only an unproven threat.

Telephone companies face potential competition for data transmission and other nonvideo services from many technologies — including satellites, FM subcarriers, AM baseband signaling and private microwave — but CATV seems to be the only technology the telephone companies are attempting to stifle now.

The telephone companies claim that competition from cable will siphon revenue and cause local telephone rates to escalate sharply. Implicit in the telephone companies' arguments is the notion that their data transmission services somehow subsidize local phone rates for voice or public message service. But testimony before state utility commissions by telephone company representatives indicates that, in some

(Continued on Page 8)

Hauser is chairman and chief executive officer of Hauser Communications, Inc., New York.

CON

By Harold Boel

Cable television companies should not be allowed to provide unregulated data transmission services within the local service areas.

Doing so would threaten the affordability of basic telephone service, the quality and increasing sophistication of services and the concept of universal telephone service.

The telecommunications industry is undergoing unprecedented change. Never before has there been so much promise for the future or so many unsettling questions.

Policymakers in Congress, in the courts, in state and federal regulatory bodies and in state legislatures recently have made decisions that will move the telecommunications marketplace further toward competition.

Unresolved questions about the future of the local telephone network — the economics, the technologies and the social commitments — prove clearly that some segments of the industry should not be thrown wide open to competition. For example, consider a recent California Public Utilities Commission decision. This decision prohibits competition within the service areas served by Pacific Bell.

Such competition would not be in the public interest, nor in the American tradition of fair competition.

Unregulated competition could threaten our ability to maintain universal telephone service. While our viewpoint also reflects our position on private-line high-speed data transmission, that issue is being addressed separately in California, as it may be in other areas.

Therefore, we will not address the specifics of those arguments here. Under a system where cable companies were allowed to compete — that is, an unregulated system — against local telephone companies within their service areas, the cable companies would be free to serve only profitable markets.

As the California Public Utilities Commission pointed out in a letter to the California congressional delegation, deregulation "would unfairly allow cable telecommunications companies to selectively take lucrative communications business of large corporate customers away from the regulated telephone companies, leaving the less affluent customers to pay the fixed costs of the telephone rates, not because cable operators are more efficient, but because they would serve only the profitable customers and routes, whereas the local telephone companies are required by law to serve everyone."

In addition to having the world's best national telephone system, the U.S. also has had a historical commitment to universal telephone service.

The ability to communicate at a minimum level with others on the network and to access emergency services has come to be considered almost as necessary as food and housing.

The commitment to universal service has been codified in California, which recently passed the Moore Universal Telephone Services Act.

Consistent with the public utility service concept, the responsibility for providing universal service has been borne by local telephone companies, such as Pacific Bell.

Our commitment to that responsibility is strong. But local telephone companies must have a solid financial base in order to maintain their ability to fulfill that commitment. While competition in some markets may benefit the public, allowing cable companies to enter the profitable data transmission market without any government regulation would seriously impact the revenues of local telephone companies. And as a

(Continued on Page 9)

Boel is vice-president of federal relations for Pacific Bell. His office is based in Washington, D.C.

PRO *(From Page 7)*
states, residential ratepayers subsidize the data service users.

For example, in California in 1982, the cost of providing data transmission exceeded revenue. In other words, if the telephone company did not offer the service, local phone rates could actually go down.

Telephone companies today enjoy a nearly total monopoly in providing data services. Of the total revenue obtained by all data transmission providers, approximately 98.8% goes to telephone companies; 1.05% to private microwave communications systems used by single companies such as Shell Oil Co., United Airlines and American Can Co. and only .15% to cable systems.

Less than a dozen cable systems throughout the country offer data transmission. Most of this is merely experimental. To gain a better perspective, examine the markets where even the slightest competition between telephone and cable can be said to exist.

In 1982, the most recent year for which statistics are available, Manhattan Cable TV, Inc. of New York — the cable system that provides the largest volume of Manhattan's data transmission services — had total revenue of $41 million, with $985,000 in revenue for data service.

In the same market, New York Telephone Co. had local revenue of $3.9 billion with data service revenue of $82 million.

Thus, the competition from Manhattan Cable amounted to about 1% of New York Telephone's data revenue. More significant, from 1981 to 1982, revenue from New York Telephone's data service increased 32.3% despite Manhattan Cable's presence in the market. At the same time, New York Telephone's total local service revenue increased only 11.4%.

Data transmission provides barely 1.1% of all Bell operating company revenue.

If the cable systems throughout the country were able to lure all the local data transmission business away from the operating companies — a highly unrealistic possibility — it would be necessary to increase rates less than 1% to make up any decline in net operating revenue.

True competition for local telephone companies can only develop if potential providers of alternative services are allowed by local public utility commissions to offer such services to the market and their efforts are not frustrated by regulatory burdens appropriate for monopolistic common carriers.

Such regulation should continue to be imposed only on monopolistic telephone companies with sufficient market power to inhibit competition. For example, AT&T controls more than 95% of long-distance traffic and its service, appropriately, is regulated as a utility by the Federal Communications Commission.

MCI Communications Corp., GTE Sprint Communications Corp. and other alternative long-distance carriers are essentially unregulated.

If local telephone company domination of the market for a particular service is ended, total deregulation of all providers of that service may be appropriate, and the playing field will be truly level.

Consumers will benefit if they are given the opportunity to choose among a number of competing communications technologies and service providers.

But they will never have this choice if the telephone companies finally win their anticompetition war against cable and other potential providers of alternative services.

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CON *(From Page 7)*
result, it would have a serious impact on their ability to maintain universal service.

Unregulated cable companies would be allowed to set their own rates without any administrative review to protect the public interest.

Unlike telephone companies, unregulated cable companies would have no regulatory controls; they would have no obligations to support the local network; and they would have no need to justify their prices.

They could enter and exit markets dependent only on economic considerations.

State public utility commissions, which are responsible for monitoring the quality of local telephone service at affordable rates, would have no control over the cable companies or their impact on the local telephone service.

The loss of a small number of large customers would seriously reduce telephone company revenue. And this would jeopardize both service and affordable rates.

Pacific Bell, for example, estimated that 1.2% of its customers generate about $760 million in revenue every year.

As the California Public Utilities Commission pointed out: "These revenues help to cover the fixed costs of the telephone network and contribute to holding down local monthly bills for all customers."

Local telephone companies would still need to maintain and modernize the local network in order to fulfill their public mandate.

This means not only expanding the network to meet the needs of a growing population, but offering them the ever-increasing specialized services that are made possible by today's technology and the untapped potential of the modern local network.

The significant loss of revenue caused by intra-service area competition would seriously hamper the telephone company's ability to keep the network up-to-date with technology and growth.

The threat is clear.

Higher rates mean fewer customers to bear fixed network costs.

Fewer customers mean loss of revenue, leading to even higher rates.

If that cycle continues, universal service would soon be a matter of history.

Policymakers in Congress and in state and federal regulatory bodies recently have made decisions moving the telecommunications marketplace further toward competition.

In addition, the concept of companies competing for business — one side regulated by the government in the public's interest while the other remains unregulated — is not in the true U.S. spirit of competition. On the contrary, it simply would be an example of unfair competition.

The bottom line is that allowing cable companies to provide profitable data transmission services in competition with the regulated local telephone companies is not in the public interest.

How did Codex come up with the 2600 Series, a new generation of modems running at speeds from 4800 to 16,800 bps that's so much more advanced than the competition?

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NEWS ANALYSIS

Comsat Sells SBS Share

Communications Satellite Corp. (Comsat) announced it has reached an agreement in principle to sell its one-third ownership in Satellite Business Systems (SBS). The other two owners are IBM and Aetna Life & Casualty Co.

Citing his company's "great confidence in the future of SBS," Comsat Chairman and Chief Executive Officer Joseph V. Charyk said SBS is responding to changes in the domestic telecommunications industry that will require "substantial capital investments over a period of years."

Once the terms of the sale are hammered out, Comsat expects to make $15 million, after taxes. Comsat has held its one-third ownership position in SBS since 1975.

The ailing SBS has never turned a profit. For example, it lost $123 million last year. It is pretty obvious that the only "great confidence" Comsat has in SBS is that it will continue to be a financial drag.

Lexitel, LDX Merge

The marriage between the long-distance units of Lexitel Corp., Birmingham, Mich., and LDX Group, Inc., Chesterfield, Mo., will create one of the nation's largest long-distance companies. The two resale common carrier companies will jointly serve 110,000 subscribers in the Midwest and Southwest and generate more than $100 million in revenue.

Merging long-distance units to fight stiff industry competition has become a trendy means of survival for similar companies. For example, a joint venture of Southern New England Telephone and CSX Corp., a railroad, will produce an East Coast network called Lightnet.

What sets this recent consolidation apart is the fact that both carriers will have access to the 1,700-mile fiber-optic network now under construction by LDX.

That project, combined with Lexitel's existing microwave network, which extends from Chicago to Pittsburgh, will situate the two merged carriers behind a network linking every city in the Midwest.

Judge Greene Gives Red Light to BOCs

In a recent ruling, U.S. Federal District Court Judge Harold Greene eliminated any possibility of the seven regional Bell operating companies entering the long-distance market in the near future. The Bell operating companies were clearly disappointed — but not surprised — when Greene said that he would refuse to consider such an option until the local companies had completely lost their local monopoly.

In his 65-page order, Judge Greene issued a stern warning telling the operating companies to ease up on their diversification ambitions for now and stick to providing local phone service.

The news of the service restriction shook BellSouth, in particular. The Atlanta-based operator was seeking permission to bid on a National Aeronautics and Space Administration contract that would provide the agency with its own national communications system. It didn't matter whether BellSouth had intended this move to be a reentering of the intercity market, or simply an adjunct to its total communications package: Greene saw it as the former.

The operating companies have been attempting to enter other nontelephone markets, such as real estate and equipment leasing, in an effort to finance competitive ventures. After divestiture, the Bell operating companies were restricted to providing local telephone service, selling telephone gear and publishing the Yellow Pages. They argued that their monopolies have been chipped away by bypassers, and additional revenue is needed to be competitive.

The operating companies will be able to enter other businesses, but only with the consent of the Federal Court. A formal waiver of the terms of the divestiture agreement must he obtained for a Bell operating company to pursue any business other than local telephone service. Greene's order mapped out four requirements.

- All competitive ventures must be kept in separate subsidiaries.
- Debt financing must be raised without backing from the parent.
- A venture's revenue must not exceed 10% of the parent company's revenue.
- Requests must be submitted to the Justice Department a month before the request to start business.

Judge Greene expressed the concern that, by allowing regional companies to pursue interests outside their local monopolies, local phone service "would be relegated to a subordinate place."

AT&T and BOCs Clash Over Cash

In other news of the erstwhile Ma Bell, both AT&T and the Bell operating companies are squabbling over money, with each side claiming the other owes.

The Bell operating companies maintain that AT&T owes them more than $3 billion collectively, money that AT&T allegedly did not disburse from a predivestiture $5-billion working capital fund.

For its part, AT&T argues that its former operating companies owe it $659 million, as a result of higher than expected 1984 first-quarter earnings. AT&T's antitrust settlement with the U.S. government resulted in a postdivestiture agreement calling for the division of Bell System assets. The question is, just which areas are subject to the division?

Both sides are pleading their cases to U.S. Federal District Court Judge Harold Greene, who has presided over the AT&T divestiture.

Rave Review For Olympic Mail

There was some good news for AT&T last month. According to at least one journalist who worked on AT&T's electronic mail system at last month's 23rd Olympiad in Los Angeles, the system was a success.

"I was totally impressed with the [electronic mail] system," Michael Madden, columnist for *The Boston Globe*, said. "I don't know what kind of computers they used, but it was very fast."

Madden was relying on the electronic mail system assembled by AT&T that provided event results, biographical information and communications between the Teletype Corp. Model 5410 CRT terminals.

The system was powered by AT&T's 3B 20 series of computers. Other components included 300 Teletype Corp. printers and 168 Infotron Systems Corp. 790 series network concentrators and statistical multiplexers.

Terminals were placed throughout the different venues at the Games, with more terminals at sites where there was the most traffic. For example, over 100 were located at ABC Television's International Broadcast Center.

"The most important thing the system provided was results," Madden noted. "It had a schedule of everything. You could lose track of what was going on, but all you had to do was punch a button and the computer gave you a schedule of events. It also gave bus schedules."

Madden said all the journalists he talked to were "amazed" with the system. He also praised the electronic bulletin board service it provided, which allowed the *Globe's* contingent of seven reporters to keep in touch with each other and their supervisor.

As an example of the bulletin board's usefulness, he recounted trying to reach some American doctors to discuss Gabriela Andersen-Schiess, the Swiss women's marathon runner that staggered through the final yards of the marathon before collapsing.

The columnist tried unsuccessfully to reach one U.S. doctor before leaving a message on the system's bulletin board. "About an hour later, he checked in, read the message and sent back a detailed answer about what medical dangers he saw and what the issues were," Madden said.

Madden said response time on the system lived up to its advanced billing, rarely exceeding one second. As good as the system was, however, it was not perfect. On the second Sunday of the Games, users were unable to log on. The problem persisted most of the day.

Fortunately, it was not necessary to log on for results, so they were still available even when the other capabilities were not.

He also cited the terminals' lack of an automatic carriage return feature, which forced users to return manually the cursor to the beginning of the next line.

Learning time for the system was "three minutes or so," and the system was very user friendly, according to Madden. He added that AT&T personnel were always on hand to answer any questions.

Foreign Press Gives AT&T Low Score

On another front, members of the foreign press covering the Olympic Games in Los Angeles complained when they arrived on-site last month and found a shortage of long-distance telephone hookups. The journalists also had a tough time understanding why the situation was not remedied as quickly as it might have been in the past.

What they did not realize was that their inconvenience was caused by the effort put out by AT&T and Pacific Bell as they dismantled hookups serving the Democratic National Convention in San Francisco and set up 525 special long-distance circuits for the Los Angeles Games. And they did all this while wading through some still uncharted waters of the postdivesture regulatory mess.

According to Rick Brayall of AT&T, both AT&T and the local operating company were working around the clock to install the apparatus for all of the affected news organizations, despite the fact that this would not have improved the journalists' situations.

Before the Games, orders for long-distance service were expedited as they rolled in. But, it was such a massive job that, by the time the Olympics actually began, all 525 orders were not in place.

"Divestiture was only part of the problem," Brayall said. "No longer can you go to one company for end-to-end service. Some of the foreign correspondents arrived later than others — the Chinese, for example — and there just were not enough lines ready yet. It takes longer to get these special circuits today than it did a year ago. And there are very specific procedures with these operating companies to get service to the local end."

Cleaning up after the Democratic National Convention and then setting up required long-distance service for the Olympic Games in Los Angeles two weeks later kept phone company employees bouncing back and forth between the two cities, located 400 miles apart.

"It is difficult for some of these foreign representatives of the press to understand what we have been going through," Brayall said. "In the past, they have always had instant service from AT&T, so they wonder why it is not the same now."

AT LARGE

BRUCE HOARD

Listening in on Divestiture Ditties

We may not yet have a motion picture on the breakup of AT&T, but the definitive **musical comedy** album has arrived.

It is called "Divestiture Ditties"; it is sung and spoken by a group of professional musicians called the Brook Lin Players; and it is now available on stereo cassette. Honest.

The cassette features two songs and two comedy sketches. Side one kicks off with "Breaking Up. . ." — which is *not* sung to the tune of Neil Sedaka's hit. This soulful doo-wop lament features the following lyrics:

> *Don't take Ma Bell.*
> *Don't you take her away from me.*
> *Lookee here, don't you leave*
> *my phones in jeopardy.*
> *'Cause when she's gone —*
> *and she is — and I am blue,*
> *You know that this breakin'*
> *up is hard to do.*
>
> *Do you remember when it*
> *was one company?*
> *Lord, we'd just sit around and*
> *complain how it was*
> *a monopoly.*
>
> *They say that breakin' up is*
> *hard to do.*
> *Well, you can ask Judge*
> *Greene.*
> *He'll tell you that too, I know.*
> *Those access charges, you*
> *know, they're causing a fight*
> *For those that think that*
> *phones are a God-given right.*
>
> *You know I beg of you,*
> *Don't say good-bye.*
> *Let's all give Ma Bell*
> *Just one more try.*
> *'Cause right now, you know,*
> *I am so confused.*
> *Breakin' up is so hard to do.*

Following "Breakin Up. . ." is "Questions and Answers," a dubious comedy skit built around a game show entitled "Questions and Answers, Questions and No Answers and Answers and No Questions." The dialogue will not be reproduced here because its full effect can only be appreciated by listening.

Up first on side two is "Investor Blues," a slowed-down rhythm and blues number. Make no mistake about it: This song will not make people forget B.B King. It will not make them forget Blind Lemon Jefferson, for that matter, but it is fun nonetheless. Here is a sample of the lyrics:

> *Woke up this mornin'; I've got*
> *Investor Blues.*
> *Woke up this mornin'; I've got*
> *Investor Blues.*
> *You know, with the split in*
> *AT&T,*
> *Tell me, which company do I*
> *choose?*
>
> *I could sell the stock baby,*
> *And I might rid myself of some*
> *pain.*
> *But you know, I'd have to*
> *turn around baby, yeah,*
> *And I'd have to pay my capi-*
> *tal gains.*
>
> *I could stay as I am baby,*
> *And have a stake in them all.*
> *My broker tells me I could*
> *stay as I am baby,*
> *And maybe I could have a*
> *stake in them all.*
>
> *But I gotta ask you a ques-*
> *tion:*
> *Does seven parts make a*
> *whole?*
> *Or will it mean a fall?*

ANTHONY SHULTZ

Last, and yes, least, "Divestiture Ditties" gives us "Access to Him," another comedy skit. This one is based on the fire-and-brimstone preachings of one Right Reverend I.M. Allright, who blathers on for six minutes on such topics as the God-given right to own a telephone and the blasphemous attempts to make telephone owners pay access charges.

Overall, the whole thing is good fun, which is all you can really ask of it. For those who want their own copies of the cassette, send $8 — plus tax for N.J. residents — and $1 for handling to "Divestiture Ditties," Suite 343, 103 Washington, Morristown, N.J. 07960.

One of the world's most famous communications links is about to receive a major face-lift.

The famed and fabled **hot line** connecting Washington, D.C. with Moscow will no longer consist merely of an unassuming teletype machine deep in the penetralia of the Pentagon.

Instead of 67-word-per-minute communications between the two powers, there will be high-speed data transmission, high-speed printers and the ability to transmit text, charts, maps and pictures via state-of-the-art facsimile devices.

According to a Pentagon spokesman, the upgraded hot line will feature three circuits, two of which will be satellite-based and one terrestrial. Although specific equipment has yet to be selected, the spokesman said it would be off-the-shelf hardware modified for this specific application.

He said that, in addition to the facsimile equipment, the link will feature microprocessors with disk packs and communications interface hardware.

Known officially as the Moscow Link, the hot line is affectionately referred to as "Molink" in Pentagon circles. It was first established in the wake of the 1962 Cuban Missile Crisis that brought the world to the brink of nuclear war. The official starting date was Aug. 30, 1963.

The hot line is considered part of the Pentagon's National Military Command Center, also known as "the war room." The innocuous-looking device sits in a small room under a shelf with a bright red telephone on top. The telephone is linked to the White House situation room.

When the Soviets communicate over the link, their transmission is beamed from Moscow to a Soviet satellite and back down to a U.S. earth station where the signal is passed on to Washington. The U.S. also transmits via satellite to the Soviet Union. U.S. officials claim they do not know where the hot line terminates in Moscow, but assume it does so in the Kremlin.

The current version of the hot line is tested every hour by both countries. U.S. testers are proficient in Russian. On the hour, they send messages on such international topics of concern as 17th-century hairstyles and National Football League rules. The Soviets typically respond with descriptions of Russian flora. Both countries transmit in their native languages.

Because of the highly sensitive nature of the link, U.S. officials refuse to say whether or not President Ronald Reagan has sent messages over it. However, the Rand Corp. did a study in which it claims the link was used during the 1967 and 1973 Middle East Wars, the 1971 Pakistan-India War, the 1974 invasion of Cyprus by Turkey and the Soviet invasion of Afghanistan in 1979.

In addition to the hot line upgrade, the U.S. also proposed the creation of a hot line between U.S. and Soviet military leaders. The Pentagon spokesman said the Soviets have not yet responded to that proposal.

As to a final date for the new hot line's implementation, he said, "We anticipate we should be able to have the system up within 24 months of the agreement."

If it is going to take that long, the two superpowers might just as well order some private lines from AT&T.

From the where are they now department:

When last we visited with May cover boy — make that cover *man* — **Al Oerter**, he was striving to make the U.S. Olympics track and field team and win his fifth gold medal in the discus competition.

However, fate and his leg turned against him at the Olympics trials when he stepped in a hole and tore his calf muscle. Oerter, the high-tech expert who works in data communications and factory automation at Grumman Data Systems Corp., was in top condition when the unfortunate accident befell him.

"I was really cranking," he said of his chances before the injury.

Despite the setback, he intends to continue to blend athletics with his career in high technology.

Hoard is editor of On Communications.

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D. Communication Service (including common carriers, telephone companies, utilities and broadcasting)
E. Systems Integrators, Systems and Software Houses, Service Bureaus and Consultants
F. Other (please specify) ______________

IV. Which best describes your communication systems and equipment buying responsibility? (circle one only)
A. Purchase
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B. 500 · 1,000
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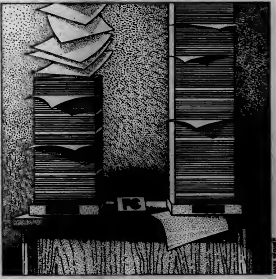
ALAN PEARCE

AT&T Tariffs Inundate FCC


MARK REGNER

AT&T Communications — the most important revenue generator for the newly restructured and competitive AT&T — is still in serious trouble with its new tariffs for all categories of services that were submitted to the Federal Communications Commission (FCC) as long ago as last October.

Most of the tariffs, particularly those concerning private-line offerings, are still awaiting FCC approval.

Unless AT&T Communications gets early approval of the prices that it submitted for its service offerings, the company's profitability and competitiveness could be seriously jeopardized.

In the first six months of 1984, AT&T's profit was $682 million — $227 million in the first quarter and $455 million in the second — on revenue of $16.77 billion. This is only a 4.06% return on revenue. In addition, revenue is substantially lower than the predicted $35 billion to $40 billion. This is because AT&T Communications is facing regulatory delays and increasing long-distance competition from MCI Communications Corp., GTE Sprint Communications Corp. and other interexchange carriers, including resellers, while AT&T Technologies is in the midst of fierce competitive battles.

AT&T Technologies' major revenue generators, the former Western Electric manufacturing arm and AT&T Information Systems, Inc., are having a disappointing year so far. The equipment business, although booming, is becoming much more competitive now that Western Electric no longer has a lock on sales to the Bell operating companies.

AT&T Communications' current setbacks are primarily regulatory. It received its latest blows when the FCC issued notices on major portions of complex and already refiled private-line tariffs and a request for further information on the Message Toll Service (MTS) and Wats tariffs.

The FCC found unlawful the private-line service tariff (FCC 3) and pricing point tariff (FCC 6). FCC 3 and FCC 6, which were scheduled for an effective date of July 1, would have substantially restructured private-line service offerings and pricing. The FCC said that the tariffs could not become effective because they were based on other tariffs that had previously been found to be unlawful because of local telephone company provisions concerning special access. As a result, current terms and conditions for private-line tariffs will remain in effect.

Pearce is president of Information Age Economics, Inc., Washington, D.C., and a regular columnist with On Communications.

The FCC also concluded that AT&T Communications' FCC 1, the tariff relating to MTS, and FCC 2, the tariff for Wats, can only become effective if they are revised to "explain, justify, revise or delete provisions that are vague, inconsistent and unclear in violation with Section 61.55 of the rules or are in conflict with policies developed and expressed in previous FCC orders."

AT&T has been ordered to refile the tariffs within 45 days. AT&T had originally filed the tariffs on Oct. 1, 1983, with an effective date of Jan. 1, 1984. The FCC suspended the tariffs until April 3, 1984 and began an intensive investigation into their lawfulness. Subsequently, the tariffs were suspended for the maximum five months, until June 1, 1984, and AT&T later decided to defer the effective date until July 1.

High officials of AT&T Communications are busy scratching their heads and asking: "What's wrong with our tariffs?"

In view of their attempt at fairness and the company's realization that the tariffs would be closely investigated by the FCC, competitors and even Congress, what has AT&T done wrong?

First, AT&T has not fully realized that the tariffs are being submitted in a new era of competition.

Second, the tariffs are complicated and contain internal inconsistencies that are not fully explained.

Third, AT&T raised everyone's expectations by announcing that it had simplified the tariffs.

Fourth, AT&T's competitors are fighting to keep the old tariffs in force as long as possible, largely because this prolongs their competitive advantage over AT&T by preventing the new tariffs from going into effect.

Fifth, many large businesses are lobbying intensively against some of the new private-line tariffs because they have been increased substantially. As a result, heavy users of private lines, who have powerful lobbyists walking the halls of the FCC, are deliberately procrastinating in order to defer implementation of steeply increased private-line rates.

Sixth, AT&T has few friends at the FCC, particularly in the Common Carrier Bureau. This is because of AT&T's bombastic approach to getting its tariffs approved in the past.

Seventh, the FCC is understaffed because of budgetary constraints. Consequently, although the tariffs are being given a high priority, a comprehensive review of 250,000 pages of new tariffs takes a significant amount of time.

AT&T Communications, it seems, has forgotten the eight attributes of a sound rate structure in developing its new MTS, Wats and private-line tariffs. These are:

- Simplicity, understandability, public acceptability and feasibility of application.
- Freedom from controversy regarding proper interpretation.
- Effectiveness in yielding the total revenue requirement under the fair rate of return standard.
- Long-term revenue stability.
- Rate stability, with a minimum of unexpected changes.
- Rate fairness, especially in the way costs are apportioned among different classes of consumers.
- Avoidance of undue discrimination in rate relationships.
- Efficiency of the rates in discouraging wasteful use of the service while promoting all justified types and amounts of use.

After reviewing these eight principles of good rate structure and levels, AT&T should attempt to construct tariffs that reflect a concern for clarity, simplicity, understandability, fairness and freedom from controversy.

A good start could be made by presenting a well-written and tight introduction to the complex private-line tariffs. This should explain the principles behind the tariffs, present the new tariffs alongside the old tariffs, give examples of tarrif changes in each category of service and attempt to summarize the supporting data.

In addition, AT&T Communications has to face up to its serious communications problems with the FCC and Congress. It must be prepared to spend more time, not only filing the tariffs before the FCC, but also educating senior staff members and the commissioners themselves as to how the tariffs were constructed and why.

Finally, AT&T has to tell major customers why they must pay more for private-line services when they have come to expect rapid decreases because of competition. AT&T Communications is facing serious problems in getting its new tariffs approved. Most of the tariffs that should have been effective Jan. 1, 1984 are still awaiting FCC approval. This is causing a minor financial crisis for AT&T that could become major.

Some of AT&T's adversaries are delighted at AT&T's problems. AT&T Communications' competitors want to hobble the company for as long as possible, while its major customers want to pay as little as possible for as long as possible. For now, it seems that the competitors and AT&T's major customers are winning the battle simply by procrastinating. AT&T has invited trouble with the FCC by submitting complicated tariffs without adequate explanation. AT&T must turn this around quickly.

AT&T also faces opposition from Congress. As a consequence, AT&T must take some time to explain its tariff-making to senior politicians and their staffs.

AT&T is too important to the U.S. economy to have the delay in tariff implementation cause serious financial damage. Unless AT&T acts soon, the company could be seriously hobbled during a period of rapid growth in long-haul telecommunications services.

Computerworld
On Communications
September 5, 1984

[illegible] of age [illegible]

In [illegible] life has never been [illegible] Pa- [illegible] in [illegible] of [illegible] plus [illegible] In an [illegible] can be [illegible] where the [illegible] is a 50-mile drive and [illegible] delivered only twice a week, [illegible] can be a handy item.

So [illegible] the area been hooked up in [illegible] According to Gary [illegible] of network distribution [illegible] for Mountain Bell, the answer is a simple matter of dollars [illegible] area, [illegible] (see [illegible]).

But in [illegible] 1983, Mountain [illegible] agreed to hook up the area, and [illegible] vice is scheduled for late 1985. [illegible] tain Bell's estimated cost for the [illegible] ect is $250,000, and the state requires the customers to [illegible] maximum of 25% of the [illegible] According to Jeff [illegible] Bell's engineer for the [illegible] crowave solution will [illegible]

The project does [illegible] lucrative for Mountain [illegible] explained, "For [illegible] about $53,000 that [illegible]

[illegible] is managing editor of On Communications.

come up with. We are investing about $200,000 of the company's money just to hook up 11 customers." According to Mountain Bell statistics, the average net investment per access line in Wyoming is $2,662, while in Arizona, it is only $1,375 and considerably less in more developed states (see figure on Page 18). Hubbard said, "It's a very expensive project, and we'll never regain our expenses."

The investment comes at a time when the Bell operating companies are facing unprecedented financial changes due to divestiture. The original bids for the project were made before divestiture, when Mountain Bell received subsidies from interstate toll rates, and local rates remained low. "That is the mechanism working in divestiture," Don Holt, district manager of distribution services for Mountain Bell, said. "We no longer have the availability of those subsidy revenues, and consequently, the costs are going to come out of something else."

Despite financial constraints, Mountain Bell has decided to provide the service, a decision that Overturf called "political" — that is, to honor the firm's predivestiture commitment to universal service. "The tariffs only say that, due to budgetary constraints, you can refuse to provide service. But how long can you refuse? We're franchised to provide service there, so how long can we morally put their requests in the back drawer and refuse to provide service?"

And, indeed, the question of providing telephone service can become a moral issue when an area is as remote from communications as Meadowdale is. Glendo consists of a sleepy two-lane street, complete with the Town and Country Market, a U.S. Post Office and a hotel posted with both. Vacancy and No Vacancy signs. At the end of the street is the Last Chance Beauty Salon, and a few miles away is the Glendo Marina, where travelers have their last chance to use a public phone, which is 15 miles from the nearest ranch in Meadowdale.

The drive from Meadowdale to the phone at the marina takes at best a half an hour on what rancher Lee Cundall calls "a scenic cow trail." The road goes down a steep curve, over the Glendo Dam on the periphery of the reservoir and then around a curve on the side of a rocky slope. Once atop the slope, the road enters Open Range country — that is, where the deer and the antelope play and where livestock roam the ranches with or without fences barring them from the road. And if you hit a wandering animal, you become its proud owner.

After a few cattle guards, the road is mostly unoiled and soon becomes a dirt road. The area itself has a stark beauty — treeless fields and miles of cloudless skies. What may seem lonely and isolated to an Easterner accustomed to city skylines is peaceful and private to the ranchers in the area. "Why, there will always be deer out here in the meadow," rancher Cundall said. "In the spring of the year, there is an old momma fox that has her pups up there, and we sit here and watch them play."

Cundall, like many of the ranchers in the area, said he goes to big cities as seldom as possible. "Sure, if you live in a rural area, you have more hardships: Our closest doctor is 50 miles; our closest show building is 50 miles.

Reach Out

Residents in the remotest of the remote can take heart. There are other options available or in development stages for telephone service in rural areas.

The Relay Instrument Division of Westinghouse Electric Corp. in Coral Springs, Fla., markets a telephone system that converts voice signals to radio waves that are sent over power lines. Dan Russ, marketing services manager for the Westinghouse division, estimated the cost of the equipment to be about $40,000 at each end of the line, as opposed to the $250,000 quoted by Mountain Bell for the system in Meadowdale.

The system, RTC-10, has been in production for four months and is installed on an island off the coast of Georgia.

But the system can only provide 13 channels, and thus, is not feasible for an area with 30 potential customers, such as the Meadowdale area. "One of the things in our development program is to up to 24 channels, and we would hope to get to 48 eventually," Russ said.

Another firm involved in development stages for such a system is International Mobile Machines Corp. in Philadelphia. According to George Calhoun, vice-president of planning, the firm is developing a digital wireless telephone system that will operate 20 to 30 miles from a base station. Dubbed Ultraphone1, the unit will fill a need "that is greatest in rural areas, particularly in areas that have subscriber densities of only a few people per square mile."

— *Patti Hartigan*

No Phone On the Range

Photo by P. Horigan

Boyd and Doris Leonard find creative ways to communicate.

But then you don't expect to have Denver and Cheyenne and Casper and all of their people. It depends what side of the coin you look at."

Most, if not all, of the ranchers would agree. In fact, some take the lack of phone service in stride. John Q. Adams, a 75-year-old rancher who lives alone on his 1,000-acre farm, said he would simply "do without" a phone in an emergency. "Sure, a guy could break his leg or you could get sick or something, but the neighbors are close," Adams observed. He said he has no intention of signing up for a phone. What does he do when he wants to communicate? "Why, i jump in my car and go see 'em," he said. "My daughter only lives 50 miles from here — that's a short distance, isn't it?"

That distance is short according to rancher standards, but distance is a problem for system maintenance. Mountain Bell service engineers are located 27 to 30 miles from the switching office in Glendo, then it is another 20 or so miles into the area. Overturf explained, "You are looking at an hour and a half drive — one way. And that is in the summer; in the winter, you can't get there."

The ranchers, however, are accustomed to the hard winters and face the weather and other hardships with aplomb. For instance, Cundall took communications into his own hands. An established rancher who "was born and raised in this country," Cundall built his own private telephone line to replace the Mountain Bell service that was discontinued in 1957 when the Bureau of Reclamation put in the Glendo Reservoir. "We owned the land where the lake is, and when the [Bureau] paid us for the land down there, they had to pay for the telephone." Cundall chose to take the money and install his own phone, on which he has had his share of problems. His phone, he said, is the only privately owned line in Platte County, but like the other ranchers, he has signed for a phone with Mountain Bell. He said he is tired of fixing his line every time it goes down.

According to the neighbors, Cundall is more than generous with his phone. Often, he is the bearer of bad news. "One of the neighbors' husband was in the hospital," he recalled, "and they called from the hospital. Her husband had died, and they wanted to know what to do with the body. They told me to go get her." Cundall paused. "'It's kind of bad; he was a close friend and all."

But along with the discouraging words come the encouraging ones. "A lot of times there is good news, too," he said. "Every time someone has a grandchild born, well, they call here, and i run and tell the neighbor what his grandkid was."

Some of the other neighbors have creative ways of communicating. Boyd and Doris Leonard, who live down the road from Cundall, have a two-way radio hooked up to Doris' mother's home in Glendo. Her mother, who has a phone, takes and delivers messages and can get information or help in times of emergency. Doris Leonard said, "Mom likes it this way because she keeps track of everything we're doing. There are pros and cons to everything."

But there is no escaping the inconvenience and sometimes danger of not having a telephone. Last summer, on the first day of the harvest, a rancher got his hand caught in the combine and could not get it loose. "His son happened to be farming right close," Doris Leonard said, "and he ran here and had me call Mom to get the ambulance. That was an emergency — that guy was in shock — but what would have happened if we weren't here?"

And there have been such times. Rancher Judy Archie remembered when a neighbor died in 1981. He had a heart attack, and when the ambulance arrived, it took him to the hospital in Wheatland, which is approximately 50 miles from Meadowdale. "He

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No Phone On the Range

died within a block of the hospital, and there is a good chance he wouldn't have died if there hadn't been the wait. It was something like 40 minutes that he laid out on the road there while the ambulance was coming." There is one emergency medical technician in the area, but even so, it is clear that a phone becomes a necessity in life-or-death situations.

The death of the neighbor spurred Archie to set out full-force to get telephone service in the area. According to the Leonards, who have lived in the area since 1957, there have been several attempts over the years, with a few options for do-it-yourself projects. These involve the customers laying the cable themselves with a Mountain Bell engineer available to supervise the project. Such a project never occurred in the area.

In February 1980, Archie contacted United Telephone Co., an independent telephone company operating out of Scotts Bluff, Neb. After driving the area, a United Telephone engineer decided that the project was not feasible.

The question of the feasibility of system installation is crucial to the Washington, D.C.-based Rural Electrification Administration (REA). The REA was empowered in 1936 to extend funding of electric services in rural areas, and in 1949, the act was amended to include telephone service as well. According to Jack Arnesen, assistant administrator for telephone services at the REA, any company or cooperative applying for a loan must submit a marketing forecast. "We determine the feasibility, and if it is feasible, we make the loan. Then, everyone within that service area is to get service without any construction charges," Arnesen said.

But, he added, the system being set up in Meadowdale for 11 to 30 customers "would probably not be a feasible system — not these days."

Archie said she has looked into obtaining loans from other sources, but was advised by an attorney that a loan would not be wise. It would involve too many people making payments, and if one or two balked on a payment, the others would have to make up the difference. She also investigated the possibility of obtaining grants to subsidize installation costs, but to no avail.

Despite her inability to get funding, Archie persisted. In December 1980, three representatives from the area met with six Mountain Bell representatives and two Public Service Commission representatives. And Archie, who was raised in a home with nine phones, claimed that the Mountain Bell representatives were condescending at this meeting. "They put us at a table like we were defendants on trial," she said, "and the first thing they said was, 'Why do you want telephones?' Now, we are kind of country kids, but that was a dumb question, and if we were not so nervous, we would have said, 'Why do *you* want telephones?'

"It is not necessarily a matter of want; it is a matter of needing it," she said. "At this point, when they can send people to the moon, why are there people that do not have telephone service?"

In fall 1981, Mountain Bell offered the citizens a do-it-yourself project, which would cost each customer $2,800 if all the residents agreed to participate. And getting all the potential customers to agree, according to Archie, "would have been impossible."

However, when her neighbor died in 1981, Archie resumed attempts at negotiation. On Feb. 28, 1982, she and the other citizens of the area wrote a letter to Robert Timothy, who was then president of Mountain Bell. The letter outlined their attempts to obtain service, the price quoted at $2,800 and the death of the neighbor. It then suggested: "We watch the advertising on television where Bell Telephone urges us to 'Reach Out and Touch Someone.' We've all read what television advertising costs for one minute, and we wonder why one or more of these commercials couldn't be eliminated and the monies be used to help those that are still coping, in this age of space travel, without phone service."

Timothy answered the letter two months later, noting that there was nothing he could do as Mountain Bell was bound by the Public Service Commision tariffs.

And the Public Service Commission, according to Overturf, "was caught between a rock and a marshbog on this issue" because of the tremendous cost of the project. He explained, "They realize that all of their other constituents are going to have to subsidize that service, so they are kind of hard-pressed to say, 'Yes, Mountain Bell, we want you to provide that service out there that costs a quarter of a million dollars, when we could maybe spend that money in Cheyenne to provide service to thousands of customers.' "

Shortly after writing the letter to Timothy, Archie linked up with Judy Harris, who had moved into the area in 1982, expecting to transfer her phone service from her previous home in Glendo to her new home on the range. She said, "The people we bought this place from said, 'Yeah, the phones are coming.' You know in this day and age, you are used to picking up the phone and saying you need a phone at such and such address. If we had known how much trouble it was going to be, we wouldn't have bought this place."

A Mountain Bell engineer came out and measured the area and quoted a price of $4,784, for which she and her husband signed an agreement. After many attempts to determine the status of her application, Harris said she was told her file had been lost. "I was on the phone for about an hour one day, and finally, I was told they found our file and that it had been thrown away and someone had written on it, 'Wes Harris called and said he didn't want a telephone.' " According to Harris, her husband Wes, who works for the Bureau of Reclamation, needs the phone for his job.

Harris described the situation at Mountain Bell as "confused." She said the most annoying part of the negotiations was receiving the runaround from Mountain Bell. "One person would say one thing; another would say another. I wish they called me and said, 'Boy, it is just not feasible for Mountain Bell to do it. I am sorry.' "

According to Harris, if they had not struck the deal before divestiture occured on Jan. 1, 1984, it would never have happened. Last year, the Meadowdale residents met with Mountain Bell officials, who were led by Dave Sechrist — who Harris and the rest of the ranchers agree has been "just super. He really cared." In June 1983, six ranchers signed an agreement to get phone service for $4,852 per customer. To date, eleven ranchers have signed.

Under the agreement, each rancher paid an initial $250 down payment and then 25%, or $1,213, by Jan. 1, 1984. The rest of the money has to be paid off in monthly increments the year after installation, which is set for late 1985. The deal excluded Archie and other ranchers in her area, and as yet, they have no hope for obtaining service.

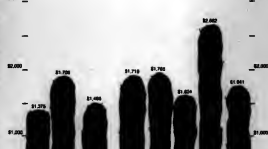
Most of the ranchers feel that the fee is exorbitant, but some want service so badly that they are willing to pay for it. However, Adams, the 75-year-old rancher who has lived in the area for 28 years, said he has no need for a telephone. "All I need one for is gossip," he said.

Some of the other ranchers, however, cite more tangible reasons for signing up for service. Health emergency, of course, is the most obvious reason, but Archie pointed to the problem of law enforcement in an isolated area. If anything were to happen, say a robbery, there is no way to contact the proper authoritories. And as Archie pointed out, "We all, I think, have guns in our homes, and they are loaded at all times. But there can be ramifications, too: If you shoot somebody, you can be tried for murder."

There are financial aspects as well. The value of property is lower without the availability of phone service. And the ranchers, who are primarily involved in cattle raising, could certainly benefit from access to market prices and the ability to close deals and order equipment over the phone. Considering the get-by state of the farming industry, the $4,852 price is a tough load to carry. As Doris Leonard said, "When you talk to a farmer these days, everything is out of line."

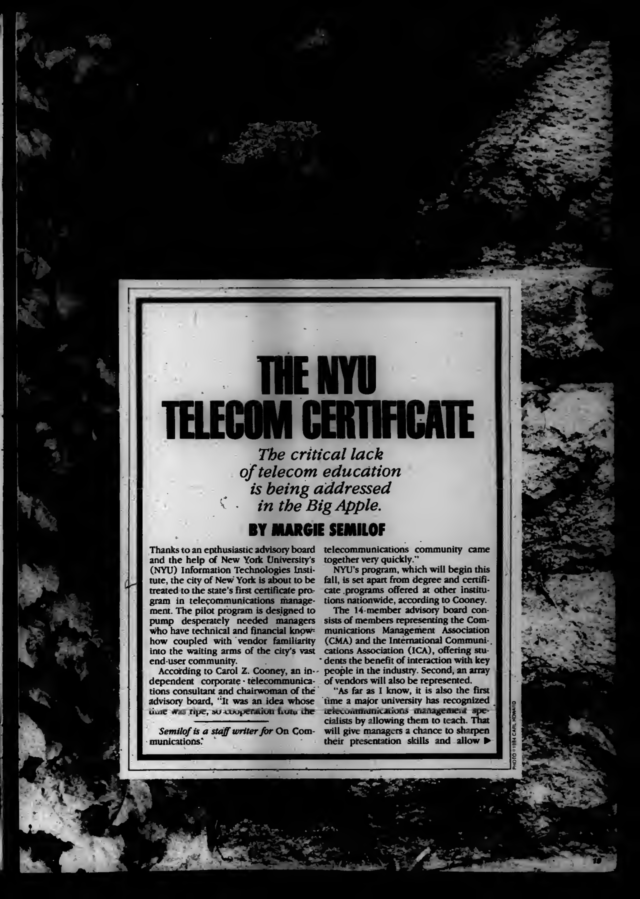
But if you talk to officials at Mountain Bell, they would claim that everything is out of line for an operating company these days, too. In the face of divestiture, a $250,000 investment is nothing to sneeze at. They must abide by the tariffs, which Overturf said he thinks should be changed to meet the new environment. And, like it or not, the ranchers must live with the quoted price.

It narrows down to one simple question: How much is phone service worth in an area such as Meadowdale? Harris summed it up: "Some people figure that $5,000 isn't worth it, but if my child was dying or my husband was dying, I would pay a million dollars. You can't put a price on a life. It would only take one emergency, and that phone would be paid for." ■



Total State Average Net Investment Per Access Line in 1983

Source: Mountain Bell ILLUSTRATION BY MITCHELL J. HAYES



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THE NYU TELECOM CERTIFICATE

The critical lack of telecom education is being addressed in the Big Apple.

BY MARGIE SEMILOF

Thanks to an enthusiastic advisory board and the help of New York University's (NYU) Information Technologies Institute, the city of New York is about to be treated to the state's first certificate program in telecommunications management. The pilot program is designed to pump desperately needed managers who have technical and financial knowhow coupled with vendor familiarity into the waiting arms of the city's vast end-user community.

According to Carol Z. Cooney, an independent corporate-telecommunications consultant and chairwoman of the advisory board, "It was an idea whose time was ripe, so cooperation from the telecommunications community came together very quickly."

NYU's program, which will begin this fall, is set apart from degree and certificate programs offered at other institutions nationwide, according to Cooney.

The 14-member advisory board consists of members representing the Communications Management Association (CMA) and the International Communications Association (ICA), offering students the benefit of interaction with key people in the industry. Second, an array of vendors will also be represented.

"As far as I know, it is also the first time a major university has recognized telecommunications management specialists by allowing them to teach. That will give managers a chance to sharpen their presentation skills and allow ▶

Semilof is a staff writer for On Communications.

Telecommunications Certificate

them to become more visible within their corporate environment," she said.

Cooney added that there are several telecommunications degree programs offered nationwide, including some in New York aimed at broadcast industry applications.

"But it absolutely amazed me that New York, with its large and sophisticated end-user community, had nothing to offer in telecommunications management education," she said.

Aside from short seminars, there have been few vehicles set up to churn out a supply of telecommunications managers capable of meeting today's swelling demand. Corporate executives are turning to the universities and colleges to help train and retrain their managers now struggling with new technology.

The demand for a telecommunications education combining technical aspects and managerial skills was boosted suddenly with the onrush of technology and the divestiture of AT&T, noted Michael J. Davies, a staff manager for New York Telephone Co. and an advisory board member.

"Most of today's specialists were trained by AT&T and are not conversant with other vendors," he added. "Everyone has a stake in this program because there is no longer one source of telecommunications education. Obviously, MCI [Communications Corp.] cannot ask Bell for 10 reservations in its next technical education class. A data processing education was more of a free-for-all because IBM did not own the market."

The program will address several audiences, according to Stuart Fink, director of the Information Technologies Institute at NYU. The student who has no prior knowledge of telecommunications will get a blend of technical concepts, theory and financial considerations. For those already in telecommunications, the program will fill gaps in their education. The university does not maintain that a graduate of the certificate program will be able to enter a firm and decide what system to use or function as an electrical engineer, but rather will be able to work as part of a team.

"Perhaps later on, [graduates] will be able to stand on their own two feet," Fink said. "But after participating in this program, they will be able to appreciate fully what is happening in a telecommunications environment."

He added that they are also expecting to see office managers making decisions regarding telephony. "It has gotten more complex than just deciding what color to choose. They now have to know what carrier they want, whose equipment and also be able to make some regulatory and financial decisions," Fink said.

In setting up the program, the advisory board considered one question: Would they hire a graduate of the program as a telecommunications analyst?

"Until the answer was unanimously yes," Fink said, "it meant that, somewhere, there had to be a revision made."

NYU is also making sure that the vendor and user communities are well-represented. According to Bennett H. Berman, co-director of the National Council on Telecommunications Education and advisory board member, when AT&T or the military operated the only training facilities, there were limited opportunities to get into telecommunications as a career. Now, however, if technicians or managers knew only the game plan of one organization or product, they would not only be ineffective telecommunicators, but also would have limited job opportunities.

NYU's program will rely heavily on the advisory board's list of professional contacts to find quality faculty, according to Davies.

According to Robert Annunziata, senior vice-president of New York's Teleport Communications and advisory board member, as the students are shown various technologies, like satellite communications and local-area networks, teaching them to recognize the proper system to use in each application will be stressed.

"We want to prepare someone to analyze a business situation and be able to recognize and recommend the best communications system to fit that application," Annunziata said. "It is not just the nuts and bolts, but the problem solving."

Tony Rizzo, the certificate program's coordinator, agreed. "The question out there is: 'What is best for my company?' That connotes a knowledge of the competitor's equipment and how you configure that equipment.

"When we get to courses like digital private branch exchange, the people who teach the courses will have contacts in that field. The classes will be going to the different vendors.

"We are only interested in the outside of the box, not the inside. These people will learn to talk to technicians, understand them and go to the upper-level manager to translate it into something he can talk about," Rizzo said.

Berman said that the program may also be useful for technical and sales personnel, as technicians should know what a system is used for. In addition, a sales staff could benefit by knowing more about what it is selling to users.

"Companies will become more cognizant of what telecommunications can do to their profit and loss statements," he said. "It will become crucial for the person who comes to sell them telephones to know what will interface with what and be able to work with these new telecommunications managers."

"Telephone companies cannot sell on price or bells and whistles anymore," Davies added. "They want to know why they need the system and what it will do for them. If they hired someone from this program, they would know how to ask those questions."

Fink says that NYU will try to attract between 30 and 40 students for the program's first semester in September. It will also try to arrange the program so that students can take more than one course at a time, completing the certificate in a year and a half.

The university marketing staff is currently sending a mailing to all NYU students and alumni, as well as members of CMA, ICA and subscribers to communications-oriented literature. They expect to draw most of the student body from the working community, so courses are set up in the evening and on Saturday.

"I suspect that we will also get people taking just one course," Fink added. "Many people in telephony may want to look at data communications and vice versa. They both may want to look into satellites.

"For those people who do not need or want a degree, this provides a way to get information fast," he said.

Fink said that courses will be taught by simulating methods, rather than by using any physical equipment.

"Telecommunications education is now where computer science was about 10 to 15 years ago," he said. "At this stage, it is questionable what hardware is necessary for teaching. You can talk about switching and networks without equipment. They have been teaching fundamentals through concepts in data communications education for years."

Cooney noted that if the certificate program were ever to grow into a diploma program, she would hope to get competitors in telecommunications to donate equipment and facilities for additional technical training.

"I would like to see this happen competitively, but by consortium, to reflect the market as it is," she said. "This would add a technical soundness to the program in addition to the strictly managerial. Even though we are hotly competitive in this industry, we are also generous. You have a lot of high-level people donating time to see this project get off the ground."

Cooney said she would like to see bachelors programs offered by the State University of New York and the City University of New York. She also envisions helping to set up a two-year program for the technician.

Davies indicated that the prospects for employment for program graduates or the increase in one's value to a firm upon certificate completion are greatly heightened.

"Everyone is screaming for people in tune with new technology to act as systems analysts," he said. "Telecommunications is a booming industry that cannot keep up with itself. Companies lucky enough to find someone trained from an end-user point of view instead of a telephone company point of view will move ahead. Those who cannot will be in big trouble." ■

Classroom Holds Key

The National Council on Telecommunications Education is working to bring industry and higher education together. According to Bennett H. Berman, a co-director of the council, it is critical for the two to be aware of their role in setting up education that will accommodate the need for trained telecommunications professionals anticipated by the 1990s.

"No one supplier, manufacturer or company can train the number of people that this industry will need," he said. "Our goal is to have at least 200 colleges with programs in place by 1987. By 1990, we would look for 4,000 to 5,000 graduates to be turned out yearly by community colleges with technical degree programs. That still may be a drop in the bucket."

Businesses are covering larger geographical areas and transporting increasing amounts of data to remote sites. Executives are becoming more concerned about what transmission costs them electronically, Berman said. "They want to know how to control it, reduce it or get a better handle on its cost, so they can factor it into their pricing structure and plug up that leak."

According to Berman, one problem is that colleges traditionally have focused on the new student. In telecommunications, however, it is more crucial to retrain the people currently working in the field.

"The American analog telephony system is converting to digital," he said. "Within the next two to three years, the majority of transmission will be along digital lines, which means that analog people will have to learn some new tricks."

Berman stressed that one of the things colleges can do is to work with their local industry in setting up short courses, thus broadening the skill base of some of the new transmission techniques.

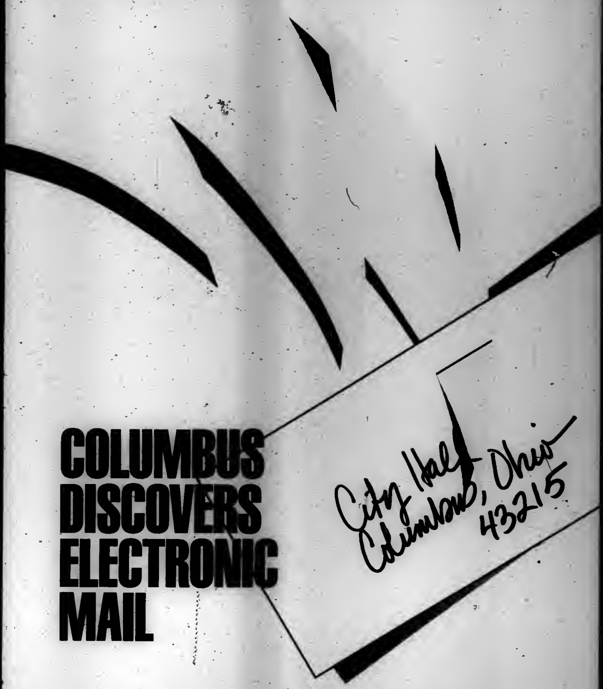
"The career field is certainly an expanding one," Berman said. "Now, when a firm needs a telecommunications manager, it hires one of those headhunter firms or goes out and taps a retired AT&T executive already familiar with networks."

As telecommunications becomes more important and new technologies emerge, it will outgrow that capability. "The people who are working in telecommunications today are really pioneers in a whole new way of life," he said.

"It will impact the way we work, think and live for the next 100 years."

— Margie Semilof

COLUMBUS DISCOVERS ELECTRONIC MAIL



COLUMBUS, Ohio — When Ohio's capital city needed electronic mail software for its Burroughs Corp.-based computer data processing system, the answer to its needs struck like an arrow.

The answer was Arrow Mail, to be precise. The problem was that nobody had an operating electronic mail system for the three 5M-byte Burroughs 3955s around which the system was built, according to Tony Bachman, information services administrator and director of the city's 480-terminal operation.

"We spent two years just looking," he said, "and then we met Arrow Mail's developer, Brian O'Haire, at a meeting of the Cooperative Users of Burroughs Equipment, an international users conference, and told him our problems."

Although Consolidated Data Processing, Inc., O'Haire's Cleveland-based software development firm, had been running Arrow Mail programs on Burroughs small and large mainframes, he was still looking for a major medium-size system on which to refine development on Arrow ▶

Mail and test it out.

It was a fortunate marriage. Today, the electronic mail system developed for one of the nation's most advanced municipal DP systems has radically altered the way the city communicates among its own forces and with its nearly 600,000 citizens.

When Bachman took the proposal to the city's Information Services Committee, organized from the city council and the mayor's cabinet to funnel and approve computer needs and acquisitions for Columbus, he made a strong case.

"We had to communicate better, cheaper and faster than we were doing it then. Take our police substations — they are not manned on a 24-hour-a-day basis, and the city had a lot of difficulty communicating with each shift at each substation with the same information. We had payroll clerks in every division and department and had a big problem getting payroll information out.

"Today, we can send a one-time message via Arrow Mail to our police. If they are not there when it comes in, fine. They can read it later, and we get a hard-copy receipt," Bachman added.

But the real impetus to changing the way the city communicates came when Mayor Dana G. Rinehart took office this year.

It was not difficult convincing Rinehart of the need for a faster system for answering citizen complaints. "This city is responsive to what people need, and anytime we can find a way to do something better and faster for the folks who live here, we're going to give it a serious look," he said.

He formed the Mayor's Action Center. Staffed by volunteer residents nine hours a day, Monday through Friday, the Mayor's Action Center uses Arrow Mail to record citizen complaints, such as broken curbs, potholes, downed tree limbs and water problems, and route them to the right department for action.

"When the mayor started to pass Mayor's Action Center hard-copy response cards around the city council on Mondays, there was a scramble to get on the Arrow Mail system," Bachman said.

Larry Nichols, assistant administrator of technical services for Columbus, reported an unexpected benefit of the system. "At first, people were skeptical about using electronic mail, but when the Mayor's Action Center hit, they turned on. We schedule Arrow Mail classes for our employees. It takes about 30 minutes to train, and the classes turned into fun.

"You can break the computer barrier with Arrow Mail, especially with older employees who are scared to death to touch the keyboard. But we teach them to send messages back and forth in class, and they have fun with it. Once they see that, it destroys that wall some people build up," he said.

Nichols predicted that, by the end of August, the system would have 600 users at 352 terminals and a target of 1,500 users by January 1985. "And we're training more as fast as we can schedule classes."

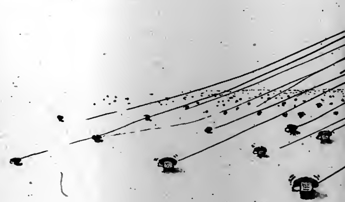
The need to train has rapidly become obvious. The city's involvement with computers is almost total. Nichols is part of a 48-person DP staff that includes 24 programmers, 16 people to handle operations, a five-man technical service staff — which does all of the city's DP repair at an estimated savings of $250,000 a year — and an administrative section. Bachman heads the entire operation.

With more than 350 CRTs and 119 remote printers, the system averages 117,000 transactions in an eight-hour period. Bachman's department's functions span DP, telephone services, mail services, reproduction, archives, drafting, copying, printing and computer output to microfiche — another in-house function.

Arrow Mail fits in well. Starting in December 1983, Columbus put the system to work checking income tax statements and issuing property liens for nonpayment of water bills. By the end of June 1984, Arrow Mail-trained users

> ***'You can break the computer barrier with Arrow Mail, especially with older employees who are scared to death to touch the keyboard. But we teach them to send messages back and forth in class, and they have fun with it. Once they see that, it destroys that wall some people build up,' Nichols said.***

WE HAVE TROUBLE LETTING GO.



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were functioning throughout Columbus. The terminal system itself sprawls across seven main buildings, the city reservoirs, police substations, the airport and a score of state and county offices.

"The state parole authority is one of our biggest electronic mail users," Nichols said.

Myron Kaliski, whose Hall of Justice office is a mile from the computer complex beneath City Hall, agreed. "We used to have to come down to the courthouse with all the documentation on a case. All that is now done with Arrow Mail. We had 40 probation officers, each with his own case load, running to and from the courts consuming tens of thousands of dollars in travel costs and hundreds of man-hours.

"Just in terms of running down here to the Hall of Justice, it works beautifully," he added. "Take discrepancies in identifiers: When we have a new alias for a subject or a new address, we make a list of the changes, mail them to the ID office using Arrow and they make the changes in the records.

"If I need to get a document to a courtroom in a hurry, I can do that, too. Sometimes you don't have the time to get to the court and cannot reach the staff by phone," he said.

An equally rigorous use for the Arrow Mail system falls under the department of taxation. Mike Jones, assistant income tax administrator, was one of the first to use the mail system.

"Anything to do with the city income tax or complaints about income tax refund delays would be addressed to me through the Mayor's Action Committee.

"It went on-line April 16, at the start of our busy period. There was a lot of detail work, and I was doing reams of internal letters and memos. So instead of calling in a secretary who was already overloaded, I would put my note on Arrow Mail.

"When I needed to do an interdepartmental memo, I'd compose it myself and ask for it to be sent to all my supervisors with a return receipt requested. As soon as a supervisor brings the message up on the screen, I know he has read it," he explained.

"Or I could add the 'Urgent' feature, and it will flash on the bottom of his terminal screen, even if he is working in another application," he added.

Like most of the users in the city, Jones has discovered his own imaginative uses of Arrow Mail. "I'm writing a uniform tax manual for the city," he said. "I rough out each section, mail it back to myself, make the corrections I want and send it to my secretary.

"I use it to communicate with other departments, like personnel and payroll, too. I foresee the day when I will not be putting out any memos in hard copy, because pretty soon our auditors will have terminals at their desks. I can see a lot of phone and paper savings," he said.

NICHOLS SAID HIS computer operations share the benefits of the system. "We have an operational mailbox so that any user in the city can send instructions via Arrow Mail to our operations staff and say, 'I want to work Saturday; I need my terminal running.' It just takes a few seconds. And that person knows it has been scheduled, because he has a receipt."

For the city of Columbus, electronic mail was a logical step in a well-thought-out system. It was not always that way, Bachman said.

"When I got here four years ago, we had computer systems that were down more than they were up. We were short of equipment and short of people."

During his second week on the job, unhappy with Burroughs' response to Columbus' problems, Bachman got the chairman of the board on the telephone and demanded action.

"But nothing happened until Michael Blumenthal took over as [chief executive officer]. Then we started getting results. From that point on, we have had an excellent relationship with Burroughs. Anything we need out of the branch office or the district office in Cincinnati, they bend over backward to deliver."

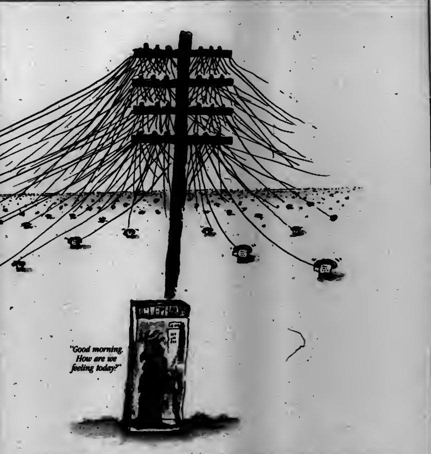
The change in attitude came just in time. "We were on two 3800s and a 4800," Bachman recalled, "and we ran out of memory; we ran out of power; we ran out of everything. So we went shopping."

Eventually, a search for a new vendor came down to Honeywell, Inc. and Burroughs.

"The day we let the bid," he said, "Burroughs announced the 900 series. The result for us was three new 3900s."

Today, Columbus finds itself close to its limits again, and Bachman is going back to the well. "We need faster machines," he noted, "and we're going to 4900s."

If history repeats itself, Burroughs had better start scrambling again. Progress-minded Columbus will probably outgrow these, too. ■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TECHNOLOGIST IRWIN DORROS LOOKS AHEAD

In his capacity as executive vice-president for technical services at Bell Communications Research, Inc., Irwin Dorros presides over technology development. His responsibilities run the gamut from applied research to systems engineering to software development.

He began his career as a technologist with Bell Laboratories in 1956. At Bell Labs, he worked on electronic-switching, data communications, pulse code modulation and digital transmission systems development programs. In 1966, he was appointed director of systems engineering programs, a position that gave him the opportunity to work on such network planning activities as cellular radio, microwave radio and computerized operations support systems.

In 1978, he left Bell Labs to join its parent company, AT&T, as assistant vice-president, network planning. In that role, he led planning for the evolution of what was then the Bell System national network. In this assignment, he was the technical leader of many aspects of AT&T's defense during the government antitrust action that led to the breakup of AT&T. He was a participant in the negotiating and framing of the settlement terms in that case.

He was assigned to his current position in December 1982 and has since led the formation of the technical portion of Bell Communications Research, drawing from personnel and assets formerly in various Bell units.

During the past five years, he has spent considerable time researching the integrated services digital network (ISDN), which is one of the hottest new communications technologies. It was on that topic that he spoke extensively during a recent interview in Murray Hill, N.J., with On Communications *Editor Bruce Hoard.*

Sometimes we seem to get ahead of ourselves in terms of new technology; we hear and read about a lot of new things. Aren't there plenty of network managers out there right now that have IBM systems and IBM bisynchronous networks who are not worried about Systems Network Architecture [SNA], let alone worried about something like the ISDN?

I don't see that SNA or the IBM or any standard computer networking arrangement is in conflict with ISDN. ISDN is a different concept for a different purpose, and it is virtually supportive to any protocol for interconnection. ▶

Irwin Dorros

No one has to worry about retrofitting networks in any way to be ISDN-compatible?

There are some protocol issues, but I don't think that there is anything revolutionary; that is, if I do something today, I don't have to worry that next year I'm going to be obsolescent. The evolution of ISDN will be gradual enough so that you gradually use the protocols of general networks. I think more and more of the corporate and public networking planners are getting involved with the ISDN planning process.

So you don't think that non-ISDN networks are going to develop to a point of sophistication so people will say we don't need ISDN because our networks are sophisticated enough?

Let's talk about what ISDN is and what it is not. ISDN is not as broad a concept and as much of a revolution as some people seem to make it. ISDN phobia has gotten way out of hand. I've looked at ISDN for five years, before most people in the computer field and anybody but network planners and telecommunications companies even thought about the concept. It is a telephone engineer's target architecture for building efficient access lines. That is all it is. Today, you need either a private line or a dial-up line to get an access line for a particular service to get into a computer. For a private line — let's say you use [AT&T's Dataphone Digital Service] — you order a 56K-bit line, and that could be a computer system, computer network port.

The telephone line is the telephone line. When you use it, it is occupied; when you don't use it, it is not occupied. The average business line is used less than an hour a day. So in between, that access line going from premises like an office building to the central office down the road is dead or unused.

If we had a facsimile line to send messages, when the machine is not turned on, it is not used. The ISDN concept says to the public telephone network engineer, "In the future, everything is going digital." Voice is going to be digitized in the telephone or the local [private branch exchange]. Facsimile is going to be digitized. Data is already digitized. Why not do a traffic engineering merger on the customer's premises with all the business needs for voice, data, facsimile and other services?

It is still data transferred. It has got to go from those premises to somewhere. Merge all this data. Interleave the data to fill the pipe. Look at the access line as what we call a digital pipe. The pipe is like electric service. It has a capacity, but you don't have to use it up to capacity. Say you have a 100-ampere service. Most of the time you are loafing away with 10 amperes, yet you don't have to have a different pipe coming into your house to serve your TV, your refrigerator, your furnace or your lights.

You are talking about interrating all your information transmission to one pipe and making more efficient use of that one pipe?

The ISDN concept is to build a digital pipe of a certain capacity to the customer's premises and bring it to a central office.

Where does protocol conversion come in to all of this?

In the central office, the protocol the customer uses to feed this interleaved information into the pipe has to be a known protocol because, at the other end, the telephone company has to unscramble it and know which bits are going where.

So some small number of these interleaved bits are reserved to the signaling channel. It is called a signaling channel, and, of course, they know which of the bits are the signaling bits. You get a bit stream, and you get just on-off pulses. You don't know which bit is which, so you

'If you are a forward-looking communications manager, you should have your people watching [ISDN], studying the technology, doing your long-range planning. They should be looking at where it is going, even though, in 1987, they are still going to have most of what they have today. Their own networks cannot evolve that quickly.'

have to go through some kind of framing mechanism to know where to start counting them. You say every 100th bit is a sign of signaling, or every 64th bit is a sign of signaling. You have to know where Number 1 is, otherwise you don't know which is the signal. You have to frame it.

In the central office, you have this stream of bits from a customer, and it has everything, all interleaved. It is used all the time, which is much more efficient than having to have a separate fiber or a separate pair of wires for every service. You have to unscramble. First, you have to frame it and look at the signaling bits. And they carry some kind of information to tell you which bits go where. Some bits go off to voice networks; some go to the facsimile; some go to data and so on.

All of that is a concept that makes access lines to a public-switched network more efficient. That seemed like a good idea to me when I was a network planner back five or 10 years ago. Everything was getting digital. The evolution takes so long because it is ubiquitous. There are billions and billions of dollars out there. You can't change everything in one year or three years. So you have to decide in the '70s what the plan is, so that in the '90s you have the right network.

What are the biggest stumbling blocks that we face right now in order to reach ISDN compatibility?

I don't think we have any big stumbling blocks. People are making more out of [ISDN], and it is usually out of not really understanding what it is. The technology that will support these digital pipes and the intelligent switches to unscramble the bits in the central office is evolving.

We're not looking for it next year. We are using ISDN as a target architecture so each little decision we make along the way is compatible with this master architecture. So in the '90s, we will have enough parts to this master architecture so that we can take advantage of the efficiency of these ISDN access lines.

You seem to say that it is not that far away, and yet you are talking about the '90s. When are we going to be able to implement this kind of communications?

The first start will be in a few years. There will be trials and experiments in limited areas with limited applications. When I say in the '90s, I mean it will be ubiquitous in the '90s. So, if you are a corporate communications manager, you do not take ISDN as a serious way of providing your needs for a number of years, because it will not be ubiquitous enough yet.

On the other hand, if you are a forward-looking communications manager, you should have your people watching [ISDN], studying the technology, doing your long-range planning. They should be looking at where it is going, even though in 1987, they are still going to have most of what they have today. Their own networks cannot evolve that quickly.

Will a user organization have one master interface to decode ISDN transmissions as they come in, or will each terminal have an interface? How will you distribute ISDN transmissions as they come into a facility?

That will have to be designed locally. As you know, the telephone company leaves off when it enters the customer premises. If you have a big facility and your own big PBX for internal communications, the local telephone carrier is not involved in that. The pipes would then be big pipes that come into the PBX, and it would be an ISDN interface with appropriate protocols.

That interface would be where this big fat bit stream comes across with appropriate signaling information that says which bits are what kind and where they should go.

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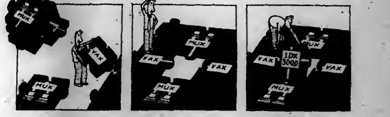

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What other areas of technology are you excited about?

The other thrust that I have, at least for the local telephone companies, is this Stored Program Control/Common Channel Interoffice Signaling Network. The evolution of that will open up a whole new range of calling and link capabilities. The one that seems the most exciting is the personal locator service, where you would be assigned a number that is your personal telephone number, and it is yours wherever you go. As long as you keep the network informed of where you are, it ends up stored in the data base. Whenever someone dials your personal number, it gets looked up in the data base. The data base decides where you are and rings your phone. It will always find you, if you are diligent about keeping the network informed of where you are.

So you will be able to go anyplace you want with this capability and still be called?

Yes, that's right. The thoughts and conceptions behind this kind of service were done in the old Bell System, where we didn't have a problem of coordinating the different carriers that are parts of the call. One of our challenges is to get the industry together so that we don't lose the capability of providing all these things with a fragmented set of suppliers.

Dorros stands in the forefront of technology.

What do you think of the International Standards Organization's [ISO] Open Systems Interconnect model? Do you think it is something that will catch on, that will truly become an international standard, or are there already de facto standards in place that will make it difficult?

I don't know. That's an example of a noble attempt by a major world standards body with participants all over the world to try to structure something in an area where they thought they needed structure.

The first question I ask is: What do you do with the seven layers? Suppose I say that the difference between Level 4 and Level 5 is such and such. What do I do with it as a designer or a buyer or a user? Who does what with it? I'm not too sure. It's a good way of understanding everything from the lower level to the upper level. I have to understand the diagrams. It is kind of an intellectual exercise that is useful for understanding technology. But I don't know that it will be a major structure to hang an organization of something on.

The model conflicts with SNA. It is similar to SNA and yet different at the same time. One can't help but wonder how anxious IBM is going to be to change SNA in order to be compatible with ISO.

That is, of course, up to IBM. Compliance with the standards is voluntary, and that is why when you asked what I think of it, I said I didn't know. I was thinking that a large, dominant supplier like IBM has its own advantages to be the de facto standards setter. If there is an international standard, it has to evaluate whether we hear it or not, based on its own business interests.

There is a big move toward digital. Do you think that we will see a hybrid type of combination between analog and digital in the future? What's the future of analog at this point?

It will be a number of years before analog is all gone, if ever. Consider the basic elements of the hardware that you build, whether it is telecommunications or computers. As they merge, the basic building blocks are integrated circuits. As integrated circuits become smaller, higher yield, more powerful and faster, electronics become cheaper, and you can do more powerful things. The integrated circuits are easier to build, easier to control if they are digital.

But the faster, cheaper ones are more and more often digital. And it becomes easier to take information that is basically analog when it originates, like voice or video, and convert it to digital right at the source.

Ten or 15 years ago, it was a very expensive thing to do. Now, that's becoming cheaper, too. The conversion part — going from analog to digital — is not purely digital. There is an analog part and a digital part of this converter. That could very well end up being the most expensive element. But once you are in digital, the dramatic, almost unbelievable decrease in cost of the integrated circuits drives you more and more to digital. ■

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THE TECHNOLOGY

By Nancy Jesuale

The need for telecommunications pathways is growing at 20% to 30% per year. Current estimates place the U.S. data communications market's annual revenue at $3 billion to $4 billion in 1984, and that figure is expected to increase to between $12 billion and $24 billion by the end of the decade.

The majority of data traffic currently is carried by the telephone system. Divestiture of the Bell operating companies from AT&T and the rapidly increasing demand for more, as well as better, data paths are producing rapid increases in the overall cost of telephone data service. The combination of rising costs and ▶

Jesuale is a consultant for the San Jose, Calif.-based research and publishing company Strategic, Inc.

burgeoning demand for data paths is encouraging many users to consider some of the lower cost alternatives to telephone company-provided circuits. These less expensive alternatives also may provide more reliable service and more efficient service, especially at higher data rates.

SEVERAL alternatives to delivery of data via traditional twisted-pair copper-wire are currently maturing; among these are broadband coaxial cable-based television systems, digital termination systems (DTS), satellite and microwave systems, high-capacity, fiber-optic cable laser and infrared light beam systems and cellular mobile radio. Users with particularly localized communications needs — that is, circuits for intracity voice and data delivery — are looking at DTS and cable television systems because of their intracity configuration, potentially lower cost, higher data rates and other efficiencies.

As alternative service providers to telephone companies establish themselves in the marketplace, users will be in the position to shop around for appropriate types of systems and suppliers. This is a far cry from the telephone companies' virtual monopoly over local voice and data lines.

CATV has a tremendous capacity for localized data communications, videotex, teleconferencing and some voice applications. Regulatory uncertainty is a major hurdle to initiating cable-based data networks. State and federal regulators are currently debating whether CATV service should be categorized as a communications utility or allowed to enter the data communications market as an unregulated competitor to telephone companies. The impact of these regulatory decisions will be critical to the future of cable as a data communications medium.

CATV systems employ broadband coaxial cable, which consists of a single copper wire surrounded by an insulating layer of polyethylene foam and encased in aluminum tubular shielding. When current is introduced into the cable, the copper wire and the outside shielding react with each other, setting up a magnetic field that inhibits its frequency loss, which is the key to cable's immense carrying capacity.

Broadband cable differs from baseband cable in that it can carry many simultaneous signals on separate frequencies. Broadband CATV systems use bus or tree configurations; that is, the cable emanates outward from the central processing station, or the headend, like the branches of a tree.

By convention, television signals are carried on designated frequencies divided into 6-MHz spacings. (6 MHz is the bandwidth needed to carry a standard television signal.) Modern CATV systems are generally constructed with amplifiers and modulators that allow a single cable to support 300 to 450 MHz of capacity (translating generally into 34 to 54 television channels).

Because its capacity is subdivided by frequency-division multiplexing, cable has the inherent capability to support two-way or full-duplex communications by simply dividing a portion of the bandwidth into reserved channels for upstream (from the user to the headend) communications. Two-way communications over a CATV system require upstream amplifiers at intervals coexistent with conventional downstream signal amplifiers, plus modems at each end that perform signal frequency conversion and encoding and decoding functions.

Upstream or return-path signals are received at the headend and reassigned a downstream frequency to reach their destination

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on the network. Unlike the telephone system, all communications on the cable system travel simultaneously on the same wire and are assigned their circuit, or destination, by their frequency (see figure on Page 34).

In addition, frequency-division multiplexing allows users to transmit over the network on a shared basis for point-to-point or point-to-multipoint broadcast transmission.

The industry is beginning to develop a version of this for data called downloading. Data bases are downloaded, or transmitted, to users on the network for storage in their on-premises computer, and they are updated weekly or monthly. Any number of users can receive the one-way transmissions.

Sophisticated urban cable systems take advantage of cable's inherent capacity and large spectrum by dividing the cable into upstream and downstream bands. Many of the newest cable system franchisers have promised to construct a separate cable divided more or less in half for upstream and downstream signals for subscription dedicated to institutional communications needs. These separate institutional networks have the capacity to carry thousands of voice, video and data signals on point-to-point, point-to-multipoint and teleconferencing bases.

Cable institutional networks are generally dedicated or reserved-capacity cable systems of five to 25 miles, running past the central business district. Three options for splitting the frequency of the cable into duplex paths are generally available: sub-split, mid-split and high-split frequency schemes.

The sub-split format severely limits the amount of return-path communications because it allows only 25 MHz for upstream communications. But it is the more conventional design of a cable subscriber system, since amplifiers and related equipment are more readily available. Mid-split and high-split formats allow more bandwidth for upstream communications. However, in the high-split scheme, none of the conventional television channels — 7 to 13 — are supported because these frequencies fall into the guard band that separates forward and return channels. Thus, mid-split networks may be more appropriate for data networks that will also carry television signals, and high-split frequency formats are most appropriate for networks dedicated to data communications.

Perhaps most promising is the potential to interconnect intraoffice broadband local-area networks to the cable system networks for interbuilding and citywide communications and the potential to use the cable institutional networks to transmit digitized voice signals from private branch exchanges (PBX) to long-distance networks, bypassing the local telephone company service loop.

Cable networks have not developed as switched networks, thus their ability to offer conventional voice service is restricted. However, many institutional network providers may eventually offer digitized voice interconnection for PBXs.

CATV plants are not expected to offer competition to the telephone companies for providing conventional telephone service. But cable plant is suitable for transporting digitized voice to a long-distance carrier and for transporting any digital signal to a satellite uplink of a microwave facility for long-haul communications.

Although about 50% of U.S. homes have access to a cable plant, only a handful of cable systems are fitted for two-way communications — most notably, the cable systems in New York, Portland, Ore., and Atlanta. A few others are offering a range of data services.

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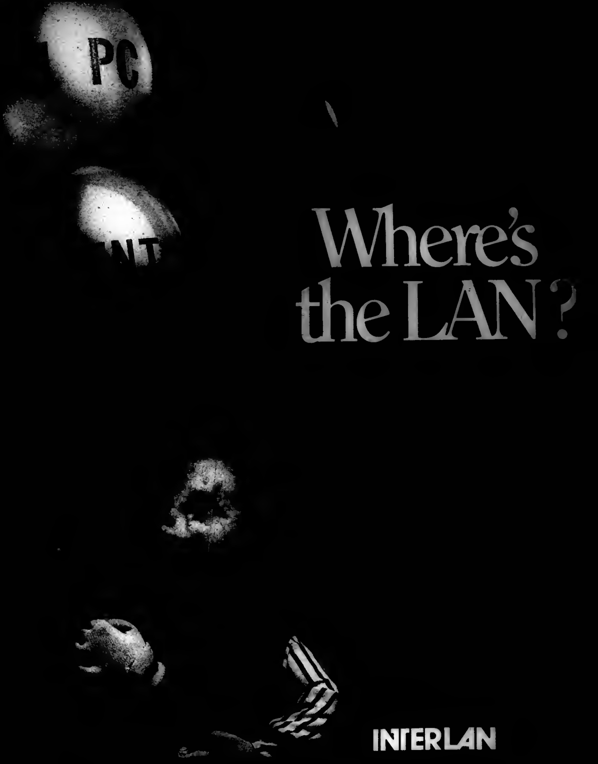
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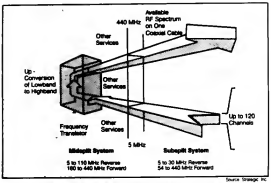

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operators, has created a separate subsidiary called Cox Commline to develop, market and operate Cox's institutional networks. Its approach is unique.

Cox Commline, unlike other cable operations, divorces the entertainment network business from the data communications or institutional network venture. This is a major step within the industry to view data communications as a separate profit center.

A few other major CATV operators besides Cox are moving into the data and voice communications marketplace. The geographical limitations imposed by municipal authorities on cable systems and the cost of cable plant construction — often more than $100,000 per mile — have forced cable operators to expand capacity by investing in DTS, which use microwave frequencies to create a two-way broadcast data path over the air, with a radius of approximately 10 miles.

Cable operators are also working quietly to develop agreements and joint ventures with the regional Bell operating companies themselves. These plans involve using the telephone plant to interconnect cable plant for data communications, creating a hybrid data network capable of a large volume of traffic on a metropolitan or regional basis.

Institutional networks now earn less than $3 million annually in the aggregate. However, the incentive to expand these networks is significant.

In most major urban centers, less than 10% of telephone customers generate 90% of local revenue. As local rates rise, at least 25% of these heavy users are considered potential bypassers of the telephone company system, a market of about $1.5 billion to $3 billion by 1990. Of this amount, $40 million to $50 million will be captured by DTS systems. CATV systems could capture about $1 billion in annual data communications revenue by 1990.

Of course, these rosy economic forecasts assume a rapid and aggressive push into the data communications marketplace by CATV operators. This has not been the case yet.

For the most part, CATV companies are still entertainment companies, and their management philosophies reflect this point of view. Cable operators are reluctant to develop data services and retrofit cable plants for two-way communications because of uncertainty about future regulatory restrictions.

Beyond this, cable management philosophies tend to be parochial. Little, if any, valid industrywide research on the market for cable data communications has been done. Moreover, there are relatively few data communications experts employed in the CATV industry.

Will CATV become a major data and voice carrier in the future? It may be too early to tell. Cable operators have not committed to a definite market strategy in this area. If the cable industry does not prove that it can and will be a major data carrier in metropolitan markets by that time, users will meet their needs using modernized and expanded telephone company-provided services. In fact, there is a strong incentive now for large users to construct entirely private networks with gateways to long-haul carriers. Once these large users have invested in such systems, it will be a difficult job to woo them away to a shared public network.

If, however, there is a significant push within the CATV industry to provide data and voice two-way services, they will prove to be a reasonable alternative to the telephone company for users. Such a competitive marketplace is obviously an advantage. ■

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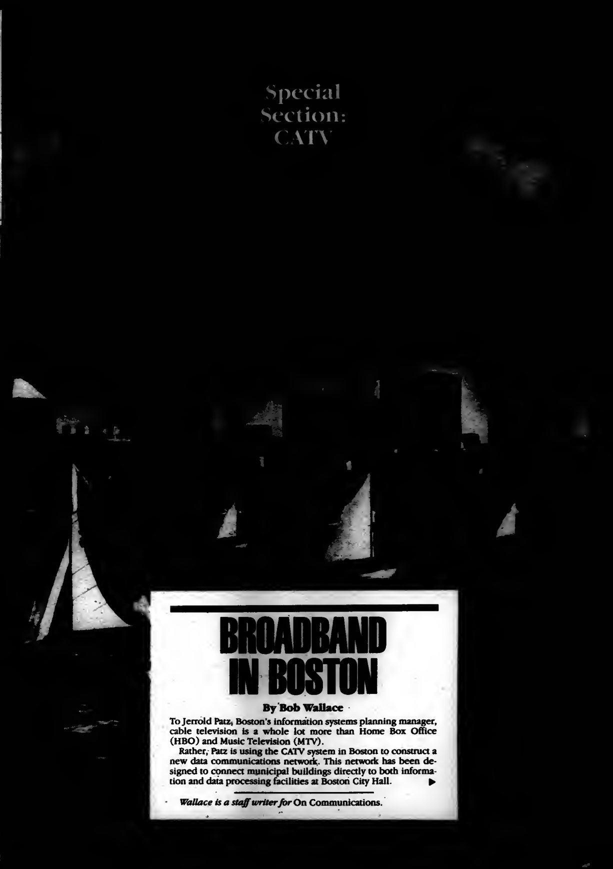

BROADBAND IN BOSTON

By Bob Wallace

To Jerrold Patz, Boston's information systems planning manager, cable television is a whole lot more than Home Box Office (HBO) and Music Television (MTV).

Rather, Patz is using the CATV system in Boston to construct a new data communications network. This network has been designed to connect municipal buildings directly to both information and data processing facilities at Boston City Hall. ▶

Wallace is a staff writer for On Communications.

The coaxial cable-based network, referred to as the metropolitan-area network, provides multiple-host computer support for dissimilar terminals. The metropolitan-area network also will be implemented as a means of drastically reducing Boston's dependency on leased telephone lines as a medium for voice and data communications.

Patz anticipates yearly savings of more than $100,000 by reallocating resources from telephone lines to the broadband network. A leased-line connection to police headquarters currently costs the city $30,000 a year. A Western Union, Inc. link with the facility to which the city tows illegally parked cars adds another $10,000 to the city's yearly leased-line tab. Patz hopes to incorporate both of these services in the city's metropolitan-area network by the close of 1984.

Cablevision Systems Boston Corp. (Cablevision/Boston) is nearing completion of its four-wire CATV system. Each of the four trunks is capable of carrying 450 MHz of bandwidth. According to Patz, the cable can support aggregate data speeds of up to 128K bit/sec. "We are running data at terminal-to-computer speeds of up to 19.2K bit/sec," he said.

The cable system features two subscriber cable networks, a commercial institutional network and a nonprofit public institutional network that is administered by the Boston Community Access and Programming Foundation.

The two subscriber networks deliver entertainment programming to residential customers. The commercial institutional network will reportedly offer high-speed voice, data and video services to the business community in the future. The public institutional network allocates 50 channels for use by the government and nonprofit organizations.

THE CITY OF Boston was guaranteed 10 of the total 50 channels on the public institutional network as part of the cable franchising agreement. These channels are provided free of charge and serve as the communications vehicle for the city's metropolitan-area network.

The cable franchising agreement requires Cablevision/Boston to install a separate cable drop for every nonresidential public building in Boston. The cable drops tie the municipal buildings to the public institutional network. The list of subscribers eligible for free network drops includes all schools, hospitals, libraries, police and fire stations and all city offices. Patz expects Cablevision/Boston to install drops for the city's public safety, police and parking departments by mid-fall.

East Boston High School was the first municipal building to be connected to the metropolitan-area network via cable drop. "The school's connection to the metropolitan-area network allows users high-speed, nontelephone company links to Boston's computer system," Patz said.

The city uses this network connection to collect such data as attendance figures and school management information. The networking of educational microcomputers is expected to become a viable application when additional public schools receive their cable drops to the network.

By gradually weaning city departments off telephone lines and onto cable as a means of connecting to City Hall's DP equipment, Patz stands to save the city thousands of dollars in leased-line charges. The top three dial-up line users — the police, fire and public school departments — will be linked to the system via cable drop by mid-fall, according to John Sheppard, manager of commercial development for Cablevision/Boston.

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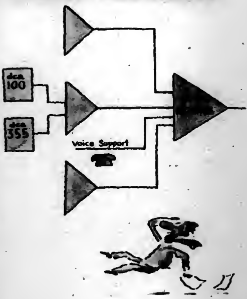

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One of Sheppard's responsibilities is to oversee development of the system's public institutional network.

The system will operate in a compact municipal area with 90% of the communications taking place within eight miles of City Hall. Although Sheppard predicts that the wiring of the cable system will be finished by the end of 1984, he added that there has been no deadline set for the completion of all cable connections to all municipal buildings.

The first step toward the development of the metropolitan-area network called for the construction of a test-bed local net within Boston's eight-story City Hall. The construction of the broadband local-area network began in 1982. "We had to have a local-area network that worked in this one building before we could attempt to create a metropolitan-area network that worked in an entire city. You have to crawl before you run," Patz explained. He said the local-area network allowed the connection of terminals in City Hall without the need for point-to-point wiring.

'We had to have a local-area network that worked in one building before we could attempt to create a metropolitan-area network in an entire city. You have to crawl before you run.'
— Jerrold Patz

Prior to the introduction of the broadband local-area network to City Hall, the building's data communications environment was dominated by point-to-point wiring. "We had closets and closets full of spaghetti," Patz said. "We actually had computers adjacent to one another that needed separate terminals. This was an odious situation."

"Duct space in the building was quickly disappearing, and maintenance of the wire was extremely difficult," added Dan Jones, municipal use consultant to the city's Office of Cable Communications.

Patz said that the decision to install a broadband-based local-area network as opposed to one using baseband technology was relatively simple. "We wanted simultaneous voice, data, video and facsimile capabilities, so we needed a multimodal technology. Baseband is unimodal and cannot be multiplexed into different channels," Patz explained.

The assembly of the local network was completed with a little help from several vendors. Sytek, Inc. and M/A-COM Alanthus Data, Inc. made major hardware contributions to the effort. Both Phasecom, Inc. and Amdax Corp., which has since been purchased by Ungermann-Bass, Inc., pitched in as well.

Sytek's hardware contributions included both a frequency translator, which is often referred to as the headend in a two-way CATV system, and a packet communications unit.

The Sytek frequency translator changes upstream channels — toward the headend — to downstream channels — away from the headend. This allows two-way transmission on the cable, according to Mort Simon, Sytek's Northeast technical sales manager. This vendor also invested both consulting and engineering expertise in the development of this limited local-area network.

The packet communications unit provides network access to clusters of devices in groups of two, eight and 32. The unit acts as both a multiplexer and a radio-frequency modem.

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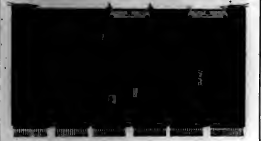

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"The [packet communications unit] allows terminal-to-terminal and terminal-to-computer communications over the distance of the city," Simon said. The terminals, with the help of the M/A-COM protocol converter, can talk to the city's IBM mainframe.

The M/A-COM protocol converter allows dumb, asynchronous Ascii terminals to emulate intelligent, synchronous IBM terminals. This capability allowed Patz to replace the intelligent IBM 3278 terminals with far less expensive dumb terminals, while eliminating the need for point-to-point wiring.

"We have connected two of three families of computers," Patz said, in reference to City Hall's Digital Equipment Corp. and IBM hardware, "and have proven the connectability of the third," he continued, referring to Wang Laboratories, Inc.'s OIS.

In the spring of 1983, after several months of experimenting with a prototype mid-split cable system, the design of the local-area network shifted from a mid-split to a high-split frequency allocation system. "This was one of the steps we took toward nirvana," Patz said.

"The high-split system gives us an equal pairing of channels and makes the most efficient use of the system," Jones explained. According to Patz, the 450 MHz of bandwidth in a high-split mode is divided at 225 MHz, thus creating a symmetrical network that offers an equal number of upstream and downstream channels. A mid-split system features far more downstream than upstream channels.

ONE WEEK AFTER CAblevision/Boston installed City Hall's cable connection to the public institutional network, the headend for the city's local-area network was relocated to the cable company's main site, thus establishing the system as a metropolitan-area network. This was a crucial stage in the development of the system, according to Jones.

"There have been a number of local-area networks operating, but they have always operated within a limited traffic area. For us to be able to move the control center out of City Hall and over to the headend and have everything continue to work was a major point," Jones explained.

The metropolitan-area network, which became operational in August 1983, was used as a means of delivering the city's election results to the local media in November of the same year. Newspapers and local television stations established connections to the network via dial-up telephone ports. All necessary protocol, speed and code conversions were performed by the metropolitan-area network.

The flexibility of the metropolitan-area network was challenged in the winter of 1983. The city of Boston Assessing Department, with 50 DEC VT100 terminals, decided to make City Hall its new home. These terminals required immediate connections to the department's DEC VAX mainframe.

"In one office, we suddenly had 50 terminals that, according to manufacturers' specifications, required 50 major pieces of dedicated computer cable," Jones explained.

THE METROPOLITAN-area network came to the rescue of the Assessing Department. The cable network was used to connect all 50 VT100 terminals to the department's DEC system in less than a week. In addition to access to VAX, the terminals, thanks to the M/A-COM protocol converters, may also access City Hall's IBM mainframe. Sytek's 32-port supermultiplexer made its industry debut as the device used to connect these terminals to the network.

In Jones' opinion, connecting the assessing department's hardware was a milestone in the maturity of the network because it established the city's ability to relocate major line departments in a very short period of time.

"Before this point, if you wanted to move a heavily computerized line department, you had to do a lot of thinking before disrupting its geography," Jones said. The cost of cable and labor and the availability of conduit space were major relocation considerations prior to the advent of the city's metropolitan-area network.

Patz sought to have City Hall rewired to achieve his goal of distributing cable technology through the building like electricity, with no work space more than 50 ft. from a cable port. His plans were temporarily slowed as all public bids solicited for the rewiring project were rejected.

Boston Mayor Raymond Flynn stepped in and negotiated a supplementary agreement with Cablevision/Boston to wire City Hall with coaxial cable at no charge to the city. "The existing test-bed cable will remain as redundant cable," Patz said.

The metropolitan-area network's future appears to be a bright one. Applications being considered for the network include intertrunking of digital private branch exchanges (PBX), training municipal employees and creating an alarm signaling system for all municipal buildings. According to Patz, inter-PBX trunking would be the most attractive use of the network, as Boston is currently spending $30,000 per month in message units to telephone other city departments.

Patz is cool on the idea of using the network for large file transfers. "We could download the city's complete registered voting list to the printing company over there," he said, pointing to a building a short distance away from City Hall. "But we would rather just run the tape across the street." ■

Special
Section
CATV

CATV OPPORTUNITIES

By John Rivenburgh

Two-way institutional and residential cable networks were heralded to every city offering its jurisdictional area for franchising. In 1979 and 1980, the promise and demand for two-way cable services was high, and the list of potential applications was large, including meter reading, energy management, traffic light control, security services, home banking, tele-education, shopping and videoconferencing.

Yet, with many urban centers — or approximately 5% of the 5,500 cable systems built for two-way service — the promise has not met the reality. For example, Cube, Warner Amex Cable ▶

Rivenburgh is corporate product manager with Rogers Cablesystems, Inc., Portland, Ore.

Communications Co.'s much-touted two-way cable system, is being canceled in recently franchised cities. Although few in the computer industry noted this occurrence, the implications for two-way cable systems are obvious: Successful systems are open and economical, and closed systems are doomed.

But what systems are open to cable networks? What new markets and services are being pursued by the industry? What developmental barriers exist? Is the cable operator a friend or passing fad to data communications?

Technically, numerous markets exist for the cable operator: personal computer communications, private branch exchange links, videoconferencing, local-area networks, teleport interconnects and so on. But why has new service development been so slow?

The industry's primary market is homes serviced by a residential network. Yet, depending on the timing and nature of the local franchising authority, the cable company must build a separate dedicated network — the institutional network — for schools, hospitals, businesses and government institutions. Often, the operator must provide free service to a political laundry list of users.

The residential network and the institutional network are service highways. A local operator's primary focus is to maintain the integrity of the system and to choose and sell appropriate services to the local market. A cable network's services are defined by third-party suppliers — satellite sources or modem and equipment vendors. Thus, innovation within the cable industry requires concurrent development of learning curves by suppliers, operators and users.

This developmental process assumes a free market. Unfortunately, the cable industry is perceived as a threat to the Bell operating companies. Regulatory action and lawsuits have inhibited free development. But exogenous forces are not strictly to blame. Many systems are not two-way, nor do they intend to be. The crucial step by the systems operator is not always taken, yet the capability for two-way service exists within most cable nets.

Recent developments in the residential network — addressable converters, automatic gain control, status-monitored amplifiers and two-way networks — have created highly reliable urban networks. One-way entertainment is now complemented with a mix of interactive services. For example, Rogers Cablesystems, Inc. processes opinion polling, channel monitoring, pay-per-view and remote change of service requests. Using Zenith Data Systems Corp.'s Z-Tac converter, with downloadable authorization codes, Digital Equipment Corp.'s PDP 11-44, Cableshare, Inc.'s software and a distributed network architecture of 600 code-operated switches, Rogers accepts 16 bits of information from each of its 55,000 subscribers every 10 to 12 seconds. Thus, 99 different opinions or movie choices can be transmitted uniquely from the home to the headend for appropriate action.

But, while two-digit options provide collective subscriber input on live choices, channel viewing or incremental revenue through individualized purchase of movies and special events, the information is not enough for true transactional and payment services. Thus, the first promise of multifaceted two-way services was dashed due to the increasing cost and limits of the converter. The reality of two-way services to the home viewer must be incremental to the two-way operation of the CATV network and thus dependent on another box for more sophisticated services.

Viewed as a multitask tool, the personal computer requires easy, multiple communications access befitting its bursty nature. Operating on the premise that a cable network is an insulated system designed for secure carriage of modulated radio frequency signals — the full spectrum of which is instantly accessible at any point within the network — personal computer communications support is ideally suited to an addressable, shared environment.

In Portland, Ore., Rogers' 900-plus-mile two-way network passes 125,000 homes and more than 30,000 businesses. According to national research, approximately 5% to 7% of the households and businesses nationwide contain an intelligent personal computer, yet only 25% of this installed base currently contains modems.

Rogers, in conjunction with C-Cor Electronics, Inc., is working with prototypes of an addressable packet-switched modem. This is called Cablepac service.

But technology does not succeed on its own merits; a useful service must exist. Thus, Rogers has entered into a number of unique relationships, locally and nationally, to enhance this new offering. For national access, Tymnet, Inc. has provided a gateway via its Tymnet Engine for direct connection into the Tymnet value-added network. With Tymnet's data bases akin to Rogers' residential satellite services, professional groups can be targeted for distinct service packages.

In Portland, a coalition of hospitals, seeking communications improvements for their emergency service, will use Cablepac to interconnect 10 trauma centers citywide. Each site will have a micro for color display of trauma center status. A single keystroke notifies other facilities of the availability of computerized tomography scanners, cardiologists and so on.

Cablepac will network professionals, such as doctors and attorneys, into specially designed communications packages for case management, remote scheduling, records transfer, billing and access to appropriate data bases. These activities with schools, users groups and computer services bureaus represent a few networking examples in Portland. If acceptance increases, the cable operator could move beyond data-switching capabilities into specialized service offerings like local electronic mail and downloading software. Even fully loaded with all personal computers, an enormous network capacity still would exist for dedicated services to businesses, government agencies and the medical and educational communities.

Two basic service offerings are available to businesses and institutions via a dedicated or integrated institutional network: data communications and videoconferencing. Each service has a number of operational variants.

A number of cable operators offer point-to-point or multipoint data services from 1,200 to 9,600 bit/sec. For example, Rogers' Cablepoint services in Portland provides branch bank communications for First Interstate Services and computerized traffic control for the city of Portland. Cablepoint is a protocol-insensitive end-to-end service. So, unlike Cablepac, all addressing is provided by the client. Unique frequency allocations differentiate each client circuit across the network.

Clients that move to the institutional network base their decisions on the measurable quantities of cost, reliability, low bit error rate and service response time. Early clients gravitate to cable because of the unmeasurable qualities of innovation and risk. A cable operator must learn to listen to its new markets or the markets will be lost. But Cablepoint is limited in an urban market like Portland. Requiring only 25 KHz per circuit, all banks could be satisfied with dedicated data service and require only one-sixth of one cable channel.

Cable operators face service pressure and client demands to offer high-speed T-1 (1.54M bit/sec) service. The T-1 link provides client flexibility to mix voice and data among remote sites through connection of client-supplied intelligent phone switches. In addition, the recent advent of intelligent buildings allows the cable operator to garner tenants for developers throughout a metropolitan area.

Besides intraclient requirements, long-distance resellers seek T-1 links connected with their major users. Thus, perceived bypassing of the local loop becomes magnified, although the service is provided under private contract. At the high data end, companies like Reuters Ltd. deliver by satellite at 5.11M bit/sec full-exchange information via a single forward cable channel. In Portland, over 25 stock brokers receive quotes via the institutional network.

Within the videoconferencing capabilities available through CATV one-way, two-way and point-to-multipoint, Rogers' experience is probably indicative of the current level of demand and comfort with television as an information source. Rogers provides numerous — three to four per month — one-way receive-only conferences for the medical community and sporadic conferences for professional groups. Conference attendees gain continuing education and call in questions via a phone link. Rogers has often demonstrated that the community does not want two-way video, either city to city or local. For the past summer, Rogers interconnected its two operating cable companies with a permanent two-way link to understand the pros and cons of intracompany remote meetings.

Rogers expects remote video surveillance to blossom. C-Cor Electronics has designed an addressable camera mount that contains appropriate modulators for signal generation onto the network and camera controls for pan, tilt and zoom. Thus, using a single return channel will allow up to 256 different cameras to be sequentially polled by a single site. Rogers expects convenience stores, banks and other businesses that are vulnerable to theft to gravitate to this service opportunity.

The promise is still there, but it has been reshaped during the past couple of years. The cable industry offers a flexible, locally oriented communications package that will satisfy many service niches and have national appeal. But the regulatory environment needs to be defined. In addition, cable operators must be more aggressive in their pursuit and understanding of business needs. Suppliers must develop more cost-effective and useful products. The users must come to grips with the reality of the cable industry. ■

THE LEGAL IMPLICATIONS

By Mark Winther

For the past two years, powerful lobbying forces of the cable television industry have been working in the Federal Communications Commission (FCC), the courts and Congress for the establishment of a national cable policy. Their goal is twofold — one, relief from what they see as an overregulated environment and two, the establishment of a national cable policy that will preempt all state and local regulations.

The cable industry's interests have been addressed in two key congressional bills — S. 66 in the Senate and H.R. 4103 in the House of Representatives — which have been dubbed the Cable Telecommunications Act of 1984. The language of both these ▶

Winther is senior analyst with Link Resources Corp., New York.

bills is strongly deregulatory and in favor of federal preemption. The fate of these two bills will be decided in the final few weeks of the 98th Session of Congress, which does not bode well for passage of any bill.

In June and July, however, the cable industry's hand was unexpectedly strengthened by FCC and U.S. Supreme Court rulings that provided more deregulation and federal preemption than the congressional bills. Consequently, the cable industry finds itself no longer able to support legislation for which it has worked for two years. As Jim Mooney, president of the National Cable Television Association (NCTA), said at a July 24 press conference, "The story is not whether the bill is or is not passed, but the protection of an industry."

At press time, it was impossible to guess if the cable industry will have a bill establishing a national cable policy at the end of the 98th congressional session. Gus Hauser, chairman of Hauser Communications and a board member of the NCTA, said that H.R. 4103 will either be a very different bill or will not go through at all. There are many complex issues, and all may change in the next few weeks. It is significant, however, to examine the events leading up to July, when the cable industry's near unanimous support for legislation suddenly dissolved.

Industry hopes for a national cable policy were raised in June 1983 by Senate passage of S. 66, the Cable Telecommunications Act of 1983. This bill was introduced by Sen. Howard Baker (R-Tenn.) and Sen. Barry Goldwater (R-Ariz.) on Jan. 26, 1983, and passed with an overwhelming vote of 87 to 9 in June 1983. The key bill in the House of Representatives — and companion measure to S. 66 — is H.R. 4103. Introduced by Rep. Tim Wirth (D-Colo.) on Oct. 6, 1983, H.R. 4103 was approved by the Telecommunications Subcommittee in November and passed on to the full House Energy and Commerce Committee.

Rep. John Dingell (D-Mich.), who, as chairman of the Energy and Commerce Committee, can decide the fate of the bill, refused to call it before the committee until he was satisfied that the concerns of the three interested parties — the cable industry, the cities and the telephone companies — were being included in the bill. The cities and cable interests managed to reach a compromise in early June. Telephone company-cable conflicts were to a large extent neutralized by ignoring such issues as data transmission and interactive services. Dingell accepted this, and the committee completed marking up the bill on June 26.

The next step is for the bill to go to the House for a vote and, if successful, to conference with the senators on S. 66 and finally to the White House for President Ronald Reagan's signature. The bill is expected to go to the floor of the House in September. The main issue is to get the House vote before congressional adjournment on Oct. 4. The Senate conference is not expected to be a lengthy proceeding, and the President's signature is not dependent on Congress being in session.

While S. 66 and H.R. 4103 have essentially been voided by succeeding events, their provisions are instructive in defining the interests of the CATV industry. The cities' interests are addressed to a lesser extent in these provisions, and the telephone companies' interests are virtually ignored. For the most part, the bills are identical, but a few provisions are sharply distinct (see story on Page 46).

In broad terms, the NCTA-Cities accord is a watered-down version of S. 66 and H.R. 4103. The major compromises struck between the cities and the cable industry involve rate regulation and franchise renewal. Two controversial issues — the degree to which specific leased-access channels would be required and whether cable data transmission services could be regulated — were not addressed in the compromise agreement (see story on Page 46).

The data transmission issue turns on whether or not cable companies can enter data transmission fields unhindered by regulation. Fear of telephone company opposition prompted the city and cable negotiators to avoid treating the issue.

In addition, in a spirit of political pragmatism, the architects of the NCTA-Cities accord carved out a definition of cable services that excluded transaction-type services and data communications.

Under this definition, a cable service — which would be exempt from regulation by federal, state or local authorities — would be defined as involved in: "the transmission of video programming, including interaction related to program selection; or the one-way delivery of information that a cable company has produced or obtained and offers to all subscribers generally, together with the interaction needed to select information."

Cable systems offering data transmission services and videotex services would be viewed as providing a noncable service, in

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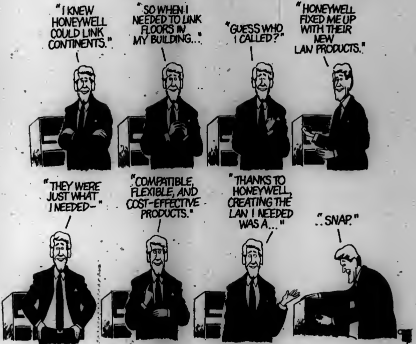
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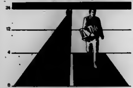

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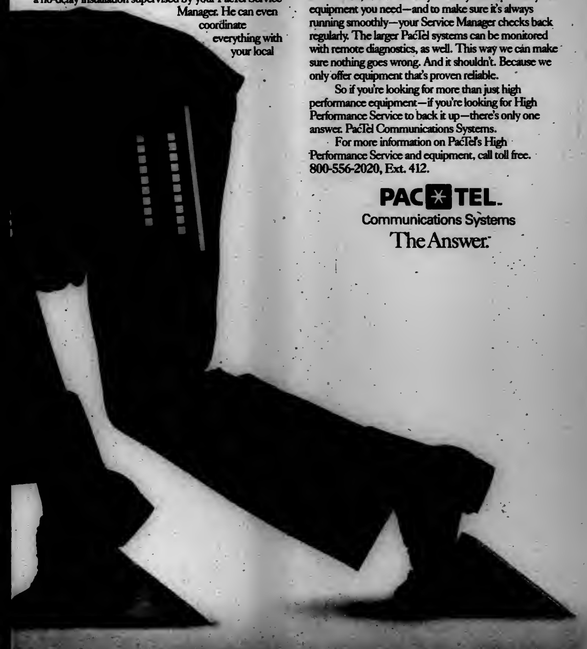

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The Battle Between Two Bills on Capitol Hill . . .

For the most part, S. 66 and H.R. 4103 are indentical, but a few provisions are sharply distinct:

- *Franchise renewals.* The two bills would require the franchising authority to grant a franchise renewal unless it finds that the cable operator has not substantially complied with the terms of the franchise.

H.R. 4103 grants operators a "reasonable expectation" of renewal if it complies with the franchise and the renewal application is reasonable.

- *Rate regulation.* The two bills would prohibit franchising authorities from regulating basic service rates of cable systems in areas served by four television stations.
- *Franchise fees.* The two bills would allow franchising authorities to require franchise fees of up to 5% of gross revenues. They would permit cable operators to pass on franchise-fee increases to subscribers and to designate the entire franchise fee as a separate item on their bills.
- *Regulation of services.* S. 66 would prohibit government at any level from regulating or restricting the provision of or nature of cable services. H.R. 4103 would allow franchising authorities to require particular cable services on the basic tier.
- *Data transmission.* S. 66 would limit local data transmission services by cable operators by requiring filing of "informational tariffs," which would specify rates, terms and conditions for provision of services. The bill would also prohibit government at any level from regulating cable as a common carrier. H.R. 4103 would prohibit the regulation of local data transmission services by franchising authorities.
- *Leased access.* H.R. 4103 would require cable systems with 36 or more channels to set aside some of these channels for lease to "unaffiliated" companies. H.R. 4103 explicitly authorizes city officials to require channels for public, education and government use and to set rules and procedures for their use. Set-asides are provided for commercial or leased access channels to stimulate use of cable by people not affiliated with systems operators. S. 66 has no set-aside provisions.

Other provisions addressed covered such things as equal employment opportunity, privacy, access to apartments and pole attachments.

— *Mark Winther*

which case oversight would be in the hands of local utility commissions or the FCC.

To clarify further the distinction between cable and noncable, examples of each were listed. Cable services are: "video programming; pay-per-view; voter-preference polls in the context of a video program; video rating services; teletex services such as weather channels; and one-way videotex services, such as news services, stock market information and catalogue services that do not allow customer purchases."

Noncable services are: "shop-at-home and bank-at-home services, electronic mail, DP, video conferencing and voice communications."

Passage of the CATV regulation seemed certain in early June; the NCTA and the cities had, almost miraculously, reached a mutually agreeable accord. But before Dingell's committee got to the bill, a rising tide of dissatisfaction swept through the cable industry. Tele-Communications, Inc., the nation's largest cable company, withdrew support from the bill and the powerful California Cable Television Association withdrew support. On July 24, the board of the NCTA and the top 50 multiple systems operators and their attorneys met and announced that if substantial changes were not made in the bill, they would withdraw support for it.

The cause of this sudden reversal was a U.S. Supreme Court decision affirming the FCC's authority to preempt state and local control over cable programming content and an FCC ruling explicitly preempting the right of local governments to regulate nonbasic cable rates.

Compared with these actions, the proposed legislation is a step backward. The heart of the controversy was the provision in the NCTA-Cities accord allowing deregulation only after a four-year transition period. According to the high court and FCC rulings, deregulation is effective today. The proposed legislation is, therefore, a reregulation of the industry.

On June 18, the Supreme Court struck down a lower court ruling that barred wine advertising on cable programs in Oklahoma. The high court stated that Oklahoma may not bar CATV systems from airing wine commercials contained in imported TV signals. In essence, the high court's unanimous opinion was more a hearty endorsement of existing FCC policy than a sweeping free-speech victory for broadcasters. The Oklahoma ban is illegal, U.S. Supreme Court Judge William Brennan wrote, because the FCC "has unambiguously expressed its intent to preempt any state or local regulation of this entire array of signals carried by CATV stations."

The decision is highly significant because it provides a broad argument that supports cable operators and programmers fighting local statutes that ban sexually explicit and certain religious fare. It is, however, uncertain how broadly the Oklahoma decision can be read. The decision pertains only to a specific type of commercial speech, namely wine advertising. Neither state obscenity statutes nor local indecency ordinances are mentioned.

On July 12, 1984, the FCC refused to reconsider the Community Cable case sought by the Nevada Public Service Commission, the National League of Cities and Dallas. In its denial to reconsider, the FCC held unanimously that a local government cannot involve itself in channel selection and that franchises forcing cable operators to include certain channels are illegal. The FCC indicated that its intention was only to make clear the scope of previous rulings, but the agency had never stated this so unequivocally before. It was the first time the FCC had explicitly stated that basic service need contain only must-carry signals.

The Nevada ruling directly addressed the related question of whether a cable operator can add or remove other types of nonlocal TV services to or from its basic group of channels. If a city will not authorize a rate increase for that basic grouping, the operator has the option of moving those nonlocal channels to other groupings and setting whatever rate it wishes. This strengthened the operator's right to unbundle or otherwise escape local control over rates for satellite services by utilizing expanded tiers.

The Supreme Court and the FCC decisions undermine the prospects for passage of the 4103 bill. Industry is wavering because it realizes it is in a no-lose situation. On one hand, it can continue backing H.R. 4103 and almost certainly see deregulatory law reconciled with S. 66 and signed by the President. On the other hand, it can risk burning its congressional bridges by withdrawing support for H.R. 4103 and be satisfied with FCC preemptions and court decisions loosening city regulators' hold on franchise fees, rates and program content.

To get the court and FCC actions written into the bill appears to be an uphill battle. The first NCTA-Cities accord reached at the start of June was the result of eight weeks of marathon meetings all over the country. Now the industry and the cities have less than a month to negotiate. In addition, full congressional consideration of the bill is forced into the last weeks of the session, which is not a positive indicator for any bill.he said this already.

While the Supreme Court and the FCC decisions are beneficial to the cable industry, there is one big negative. The Supreme Court decision did not say anything new, it merely reaffirmed the FCC's right to preempt state and city authority over CATV. The FCC ruling went further and clarified the specific role of state and local government in rate regulation. However, the FCC can reverse its opinion in future rulings. A new administration could appoint new commissioners who could easily rule in favor of state regulation of cable contents and rates. A congressional bill, however, would enact into legislation these concerns which would not, then, be vulnerable to changing FCC opinions and attitudes. ■

. . . and the Compromise

The NCTA-Cities accord strikes a compromise between the two bills, and it addresses the following issues:

- *Rate regulation.* The compromise would free most cable systems from rate regulation, with one exception: Local authorities can continue to regulate rates for basic services, including must-carry channels, for four years.
- *Franchise fees.* The agreement limited these to a maximum of 5% of gross revenues from cable operations. Increases in these fees can be passed on entirely to subscribers. Cable companies can show the fees as a separate line on subscribers' bills and treat them as a sales tax, which should improve company financial statements. In addition, payments to support access studios and community programming will be considered part of the franchise fee and subject to the 5% cap, unless an existing franchise calls for those payments to be made separately.
- *Franchise renewal.* The cities agreed to an administrative proceeding designed to protect cable operators' due process rights. Once that proceeding is completed, franchising authorities are required to base their decisions on a defined set of criteria. If it decides not to renew the franchise, cable operators may appeal that decision in court. Renewal criteria are significant, because the cable industry construction boom in the late '70s means that as much as 65% of existing franchises will be up for renewal in the next four years.
- *Leased Access.* This issue was sidestepped in the NCTA-Cities compromise. It is expected to be one of the most explosive items discussed during the House's refinement of H.R. 4103. S.66 has no provision for leased access, while H.R. 4103 has provisions requiring a calculated number of channels to be set aside for third-party programmers.

— *Mark Winther*

CATV PIONEER EDWARD ALLEN

After 26 years of involvement in the cable television industry, Edward Allen qualifies as a true pioneer. He helped build a CATV system in Winona, Minn., back in 1958 and another shortly thereafter in LaCrosse, Wis. He sold both these companies in 1964, moving to California to run Spencer-Kennedy Laboratories, Inc.'s systems.

Two years later, he moved to Chronicle Publishing Co. — publisher of The San Francisco Chronicle, *to establish Western Communications, Inc. — and has been there ever since. He is currently chairman of the board for the National Cable* ▶

Edward Allen

Television Association. At 59, he has seen the number of cable systems grow to more than 6,000 nationwide, with many metropolitan areas still untapped. When he is not presiding over the proliferation of CATV, he said he enjoys traveling in Europe and fry cooking on the weekends. On Communications *Editor Bruce Hoard talked to him recently about some of the present and future prospects for cable systems.*

Let's start out with a history of CATV.
It is about 35 years old. It started out almost simultaneously in Pennsylvania and Oregon as what we then called community antenna television. It was during the [Federal Communications Commission's] freeze on TV channel allocations. There were some fellows who were in the business of selling TV sets in communities that were hidden in valleys, behind hills — particularly in Pennsylvania, in the coal areas. They found they couldn't sell TV sets because people could not get the signals, and no more new TV stations were being built during this freeze. They got the idea of putting an antenna on the top of a tall hill so they could get the signal and then stringing wire throughout the whole city, like a citywide master-antenna system. People were familiar with one antenna on top of an apartment building, but nobody thought of having one antenna for the whole town.

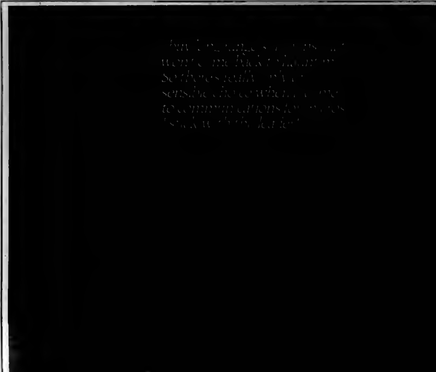
What came next?
They knew that the signals had to be amplified every 200 feet, so they designed amplifiers to kick the signal along. They started with a monthly charge to defray the cost of the wiring, the amplifiers and the antenna. Meanwhile, the FCC lifted the freeze, and everybody thought the business would go away. And it didn't, because people got exposed to more than two or three channels, liked the variety and the charge was nominal, typically $5 a month. We now have about 6,000 cable systems across the country. We serve about 19,000 communities and about 35 million subscribers. And I think we are on our way to 60 million subscribers. It has been a widely accepted service.

How have transmission techniques changed over the years?
Well, I've watched it grow from a five-channel capability using tubes to 12-channel tubed equipment, 12-channel transisterized equipment and then 20 channels, 27 channels, 35 channels and 54 channels. There is a new technology out now that they anticipate being able to put 70 — or slightly more than 70 — channels on one cable. So we have come from five channels to 70 channels on a single cable. Some people are building dual-cable plants. Typically, those have been dual 54-channel cables that then have a potential of 108 channels. They switch back and forth between the two cables.

Can you describe a typical metropolitan CATV network in terms of the hardware and configuration?
Metropolitan systems are a lot different from traditional systems. They will still have one or perhaps more headends, as we call the receiving points where we get these signals. They very often have a star configuration; they have multiple headends scattered through the city. They may be stand-alone headends, or interconnected signals from one to another. Then the signals begin their distribution path from these headends and radiate outward through a series of cables. The trunk cables are the main transport cables. The feeder cables are subtransport cables. And the drop cable, of course, goes into the subscriber's home.

What kind of a partnership does a CATV company strike up with the city, in terms of the reselling of excess bandwidth? Is that a

> ***'They got the idea of putting an antenna on the top of a tall hill so they could get the signal and then stringing wire throughout the whole city, like a citywide master-antenna system. People were familiar with one antenna on top of an apartment building, but nobody had ever thought of having one antenna for the whole town.'***



'But [illegible]
won't come back [illegible]
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common phenomenon?
No. For the most part, the industry has not had excess bandwidth. Not too long ago, about two-thirds of all of the cable systems in the country were still 12-channel systems, because when they were built, that was the state of the art. That figure is down now; about 35% to 40% of the industry is still 12-channel. Even those that have more capacity than that find a use for those channels.

It does not mean that channels are not made available to the cities, the public and the educational authorities. Those are what we call access channels, and a lot of cable systems provide channel capacity for the use of the city, the school authorities or the general public.

> ***'At one time, the FCC literally had the industry frozen through its regulation, which was designed to protect the broadcasters. In 1972, the FCC came out with the Cable Television Report and Order, and one of the FCC commissioners described it as "the most complicated set of regulations ever devised by the mind of man."'***

If that is the case, why has there been such a furor lately about the possibility of pumping data transmissions over cable networks? Is there really enough capacity there to pump data over those networks and make it worthwhile?
I think so. The industry as presently configured is not in a position to provide data transport. First, they are not two-way systems. They are one-way systems, although the new systems that have been rebuilt to greater channel capacity have included a capability that enables a two-way system to be created when there is a market for it.

The industry has wired the residential areas of cities. We don't even have cable in the downtown business areas or the outlying industrial parks, and, of course, that is where the demand for data would be. That does not mean that there is not going to be a demand for data transport in the future; I think there will be.

Because we use coaxial cable as opposed to the phone company's twisted pair, we can transport that data faster, in greater volume and for less money than the phone companies can until they get a fiber-optic system started. And that, of course, is what concerns the phone company.

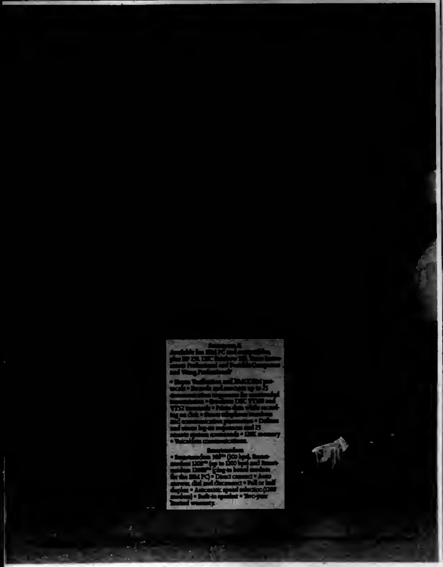
It seems as though the phone companies actually push very little data, as a percentage of all the traffic, over those local loops. Is that true?
That is true. It is a new and evolving business, especially in the point-to-point private data transmission, such as hooking together a lot of branches of the Bank of America — a private contract service. There is not a great deal of that yet.

So, the telephone companies, when they try to keep the CATV people out of the local loops, are not worrying about protecting what they have now, they are worrying about protecting what they may have in the future?
That is exactly right. They see it as a coming need, and they want to be the sole provider of that, their argument being that if they don't get that business and we do, it is going to mean higher local telephone rates, which I don't happen to believe. But it is an emotionally and politically powerful argument.

How heavy a hand does the FCC use in regulating cable companies?
It has been an up-and-down cycle. At one time, the FCC literally had the industry frozen through its regulation, which was designed to protect the broadcasters. Its principle concern was the availability of broadcast service; it did not want cable bringing in competing broadcast services.

In 1972, the FCC came out with the Cable Television Report and Order, and one of the FCC commissioners described it as "the most complicated set of regulations ever devised by the mind of man."

Since that time, though, they have determined that we do not impact the local broadcasters. The entire rationale for all the other regulation has since gone by the



believers in the free enterprise system, open competition and deregulation.

Most recently, the FCC has been taking some significant steps to deregulate our industry. It just recently came out with two very strong decisions, coupled with a Supreme Court decision that came down in a period of about three weeks, that severely limit the cities in terms of their ability to regulate cable, particularly in regard to the program content that we carry and with regard to the regulation of the rates we may charge, so it is a much brighter FCC regulatory picture than it has been in the past.

> ***'We have the capability of having our subscribers being able to talk to a computer. And to the extent we can send signals to the computer, we also could send voice to that central point, but we don't have the capability of having the switched service of subscriber to subscriber. 'I think that is properly the province of the telephone company.'***

How technically proficient are today's CATV networks in terms of transmitting voice?

Technically, there is no reason why we cannot do it. But we are not a switched system, so I happen to think that two-way voice on a switched basis is really the province of the telephone company, so that a subscriber can talk to a subscriber. We have the capability of having our subscribers being able to talk to a computer. And to the extent we can send signals to the computer, we also could send voice to that central point, but we don't have the capability of having the switched service of subscriber to subscriber. I think that is properly the province of the telephone company.

How much teleconferencing is being done over cable networks now?

Probably close to none. Teleconferencing, for the most part, is being done at Holiday Inns, for example. They use phone lines and satellites. I do not specifically know of any cable system that is involved in teleconferencing. The capability is there, but we don't do it.

Why not?

We are still wiring the nation. I guess that is the key behind all of this. There are still major metropolitan markets — Chicago, Sacramento, Calif., and Washington, D.C. — that do not have a foot of cable. So our principle focus so far is getting our coaxial cable plant up in the air. Then, once it is up and operating, the nonentertainment services — or as we call them, ancillary services — will begin to come along after that, but our primary business is what it has always been, and that is more and better TV pictures.

What kind of future applications do you envision in the nonentertainment area?

A lot of them have been tried, for the most part, unsuccessfully. I think this is because the market is not big enough, maybe because we do not know how to market.

But there have been a lot of experiments. Some companies, maybe 30 or 40 out of 6,000, have tried home security. Typically, these are in new planned unit developments. It has not been a successful business yet. There have been experiments with electronic reading of water heaters and electric meters. There are experiments going on in electronic information such as view-data teletex-type information where subscribers call up information from the home.

We know the technology is there for it, but we do not know that there is a market out there for it. Energy-load management has been touched on at least, and I happen to think, if properly explained to people, it could be a winner for the industry. If we can charge $4 a month for a service that will save them $20 a month on their electric bills, I almost don't care what the TV programming is — it would be a good buy just for that. We are looking at all these things, but we are still essentially an information and entertainment industry.

So business will have to wait?

The market will have to develop. You can't drive the market. ■

NETWORK CONTROL CENTERS

BY LOUIS BECKER

Imagine what would happen if planes flew in and out of an international airport without the aid of a control tower? Just as air traffic needs guidance, your network cannot function effectively without centralized control.

The importance of network control in a communications environment is beginning to be recognized. With AT&T deregulation and divestiture, we must accept a greater burden of responsibility for control of our corporate telecommunications networks. Moreover, as voice and data become integrated in many of these networks, the problems of network control become even more serious.

Network control can be approached through a discussion of the network control center.

A network control center is a central location from which the performance of each branch and each node of a communications network can be monitored. From this central site, an organization can quickly obtain data on the performance of each component of the network. ▶

Becker is communications consultant, Sears, Roebuck and Co., Arlington Heights, Ill.

Thus, the network control center must serve a monitoring function, a diagnostic function and, when possible, a repair function.

FIRST, CONSIDER THE monitoring function. Initially, a network may begin to develop, or simply to accumulate, without thought being given to network control on a formal basis. Perhaps one begins by installing a small computer and a few local terminals; gradually, the system grows with the addition of more terminals. The CPU is upgraded to handle a higher transaction load and larger applications. Branch offices are opened and controllers and terminals are installed. In addition to the telephone lines necessary for supporting these outlying terminals, voice traffic grows in various directions and a private branch exchange (PBX) is installed. The telecommunications services required continue to increase in volume and variety.

But who is in charge? Who is trying to track the development of this ever-burgeoning, increasingly expensive resource? For a small network, network control or monitoring is performed on an ad hoc basis by someone whose primary responsibilities lie elsewhere.

As the network grows and diverse equipment types appear at each node, experts will emerge at each network location. This results in duplication of expertise, but also in a failure to maintain expertise at the highest level. At a local node, each expert will not necessarily have sufficient opportunity to exercise and maintain his skills.

Furthermore, in a decentralized control system, there will be a duplication of effort in the administrative tasks involved in network monitoring. It is imperative that an organization have a central office from which an effective liaison with vendors can be established.

Eventually, it becomes clear that a centralized monitoring system is the proper way to handle network control. It offers distinct advantages over the usual decentralized system. These advantages include economies in the administrative tasks associated with control center development and maintenance and improved productivity of control center personnel, due to a concentration of expertise within the network control center.

In addition to monitoring ability, the network control center will provide the ability to test components and diagnose defects. These components include transmission channels, switching devices, processors and terminating equipment.

Transmission media include T-1 channels, fiber-optic lines, satellite links, the public telephone network and terrestrial microwave relay. Transmission equipment varies depending on what is being transmitted and by what means. Modems and multiplexers, channel banks (including analog-to-digital and digital-to-analog converters), various kinds of amplification devices, coders and decoders, compressors and expanders are also included.

Switching equipment must include all the devices generally described as PBXs, both digital and analog, as well as various kinds of matrix switches and, in older installations, the ubiquitous jack field or patch panel.

Processors include everything from large mainframes to microcomputers, as well as front-end processors, in which much of the communications control responsibilities lie.

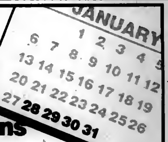
A network control center also monitors terminating equipment. Terminating equipment includes terminals and any other devices that are sources or destinations for transmission.

Whatever the transmission media or the various types of equipment involved, it is necessary to identify the problem and then take steps toward remedying deteriorations or failures in performance. In order for the control center to be effective, it must enable operators to determine the effect that the failure of one component will have on other components in the network. It must also enable operators to determine whether the apparent failure of a component is due to a problem with that component or some other component on which that component depends.

However it is defined, a control center is a major corporate commitment. How can this commitment be justified? It is difficult to give a strict dollar-and-cents accounting of the cost benefits of installing and operating a control center.

Nevertheless, an economic analysis of the typical problem will show, at least on a qualitative basis, why such a center is a worthwhile investment for any organization that maintains its own communications network. Each organization must determine the costs it will incur during each of the phases of a problem and the various impacts of one component on another.

The life of a problem is marked by five events, which separate it



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into four distinct phases. These events are:

- The occurrence of the problem.
- The detection of the problem, which may happen a considerable time after its occurrence.
- The isolation of the problem to one particular subsystem or piece of equipment.
- The correction of the problem.
- The return of the system to normal operation.

During each of the phases of the problem, costs are incurred. It can be argued convincingly that the most rapid accrual of costs is during the first two phases, from occurrence to detection and from detection to isolation.

Thus, in order to reduce the total incurred cost, it is wise to concentrate efforts on the first two phases — to reduce the time from problem occurrence through problem detection to problem isolation. An intangible but no less important consequence of shortening these two intervals would be improved service for those using the network.

The automatic monitoring of components should inform the operators of any deterioration in the performance of a component before it actually begins to malfunction enough to cause a problem.

The network control center provides a central site at which facilities and expertise can be concentrated for performing the necessary functions. As a result, the establishment of centralized network control can be justified from both an operational basis and an economic basis. This solution seems to be receiving more and more acceptance, and we are convinced that it is a valid solution.

How does the network control center function? It has devices that provide the operators with the means for monitoring the performance of the network components. In addition, the ability to test components and diagnose defects is also provided.

Monitoring can be performed as needed by the control center operators or automatically on a periodic basis. The automatic monitoring of components should inform the operators of any deterioration in the performance of a component before it actually begins to malfunction enough to cause a problem.

Whenever possible, network control also provides the means whereby the operators can solve a problem involving a defective component. Operators must have video display terminals readily available, through which they can gain access to all of the systems in the network. From those terminals, they can investigate the status of software and hardware. They can perform a variety of diagnostic and repair functions directly.

One of the most common functions is to return service to terminals that have been locked out for some reason. The operators can communicate directly with the operating systems on the several CPUs in the network and can also examine the data streams being passed along the various communications channels.

A large part of the network is connected to the CPUs at the central node by dedicated telephone lines; these dedicated lines can be switched so that a bad line can be taken out of service and replaced by a satisfactory line.

Additional equipment enables the operators to examine the voice communications lines that run through various satellite communications central offices. From the network control center, they can perform a variety of both voice- and data-related tests on lines that do not pass anywhere near the network control center.

The effectiveness of the control center is directly related to the degree to which its functions are automated. In order to provide the highest quality service to users and to reduce the problem-related costs described earlier, data and voice communications links are examined periodically by computer-driven devices. These devices perform a series of tests and record the results. When a test result lies outside prescribed limits, a message appears on the printer in the control center and is also logged against the offending component in a large, computerized configuration data base. This data base allows the operators to keep track of the history of each component.

It is desirable, however, to automate the process further. Even if test results are not outside acceptable limits, symptoms may appear that would indicate to an expert investigator — based on previous experience with the same or similar components — a probability that a particular defect will appear within a determinable time. This function is in the realm of artificial intelligence and so-called expert systems.

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Suppose we automate even further. At major nodes in the network, software-controlled matrix switches are installed. When the system finds, for example, a private line showing potential for trouble, the line would be switched out of the network while it lay idle, so as not to interrupt communications. A standby line with satisfactory test results would be switched in as a replacement. The control center operators would then receive a description of the problem, as well as the line identifier, from the computer. They would run additional tests and report the situation to the appropriate telephone company office.

However, no user would ever see a problem with this line. It would be taken out of service before a problem developed, serviced without any interruption in or degradation of service to the user and returned to use in a trouble-free condition.

There is an added benefit to the automatic testing system and the artificial intelligence built into the system for predictive purposes. With time, the system becomes capable of telling not only which problems are likely to occur and with which components, but also what steps to take and when, in order to forestall these problems. Service calls can then be scheduled in advance of need, and timely intervention can be assured. As a result, the quality of service will improve, and the need for acting by reacting to existing problems will diminish. Better control over the cost of the service provided can be exercised.

Formal, carefully defined procedures for control center operators dealing with problems must be planned in considerable detail. When the center is notified of a problem, the information provided, as well as all subsequent information in the problem-solving process, must be logged into a computerized activity and problem-tracking data base. The problem should also be logged against the offending component in a component data base.

There is a complete audit trail through the resolution process. Using these data bases, the computerized system also builds a history of problems and the steps that led to their resolution so that in some cases, the computer can take the necessary steps itself. Or it can at least suggest to the operator what steps might be taken to resolve the problem.

The operator responsible for solving a problem also is responsible for periodically contacting the user who initiated the process, if it did not originate from the automatic system. When the problem has been solved to the operator's satisfaction, he must verify with the user that the problem has been solved. Then, the problem is considered resolved.

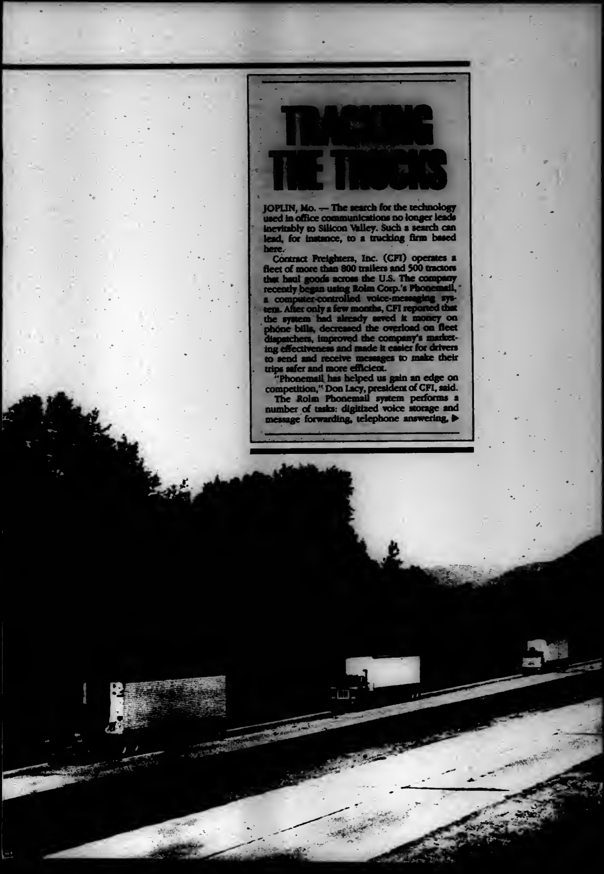
ANOTHER AID TO the control center operators is that a number of computer-generated displays may be made available on a large screen at the front of the center. Images are projected in color on the screen from the rear. The projection can show, for example, a map of the U.S.

As problems are reported, their locations are indicated by a symbol added to the projection in a color that signifies the perceived severity of the problem. If a number of problems are reported in the same part of the country, a zoom feature provides a projection of that part of the map. Details of the network can appear in colors representing their perceived status.

The operators must be highly trained; their burden of responsibility reinforces this need. The variety of application technologies will require diverse expertise on their part. In all likelihood, they will have to be conversant with data communications, digitized and analog voice communications and so on. They will have to know the technical jargon and buzzwords well enough to translate users' often vaguely phrased complaints into the more precise terminology of equipment vendors and facility providers.

Because control center operators spend a lot of time on the telephone with users, their work area must be made as quiet and comfortable as possible. This can be done by providing carpeting, acoustic ceiling tile, sound-absorbent wall coverings and a low light level to create a relaxing environment for what can at times be frantic activity. Comfortable furniture should be provided. Security is a concern, so the area should be completely enclosed and designated a restricted area.

Implementation of a fully developed, highly automated control center is a major undertaking. It is expensive and requires meticulous planning. The rewards, however, are commensurate with the effort; they include better control of network facilities and components, higher quality service to network users, centralized liaison with vendors and carriers, economies of scale and centralized reporting capabilities. ■



TRACKING THE TRUCKS

JOPLIN, Mo. — The search for the technology used in office communications no longer leads inevitably to Silicon Valley. Such a search can lead, for instance, to a trucking firm based here.

Contract Freighters, Inc. (CFI) operates a fleet of more than 800 trailers and 500 tractors that haul goods across the U.S. The company recently began using Rolm Corp.'s Phonemail, a computer-controlled voice-messaging system. After only a few months, CFI reported that the system had already saved it money on phone bills, decreased the overload on fleet dispatchers, improved the company's marketing effectiveness and made it easier for drivers to send and receive messages to make their trips safer and more efficient.

"Phonemail has helped us gain an edge on competition," Don Lacy, president of CFI, said.

The Rolm Phonemail system performs a number of tasks: digitized voice storage and message forwarding, telephone answering, ▶

message-waiting notification plus capabilities such as return receipt and message distribution. More than just a sophisticated answering machine, Phonemail permits nonsimultaneous voice communications perfectly suited to the many times during a business day when people need to impart important information to other parties and cannot reach them in person.

CFI is a growing motor carrier that projects a 60% growth rate for 1984 — from $32 million last year to an estimated $52 million this year. Telephone communications is vital to many facets of the company's expanding operations, and company managers decided to install the Phonemail system following a thorough examination of other available systems.

"Other systems provide forms of digitized message storage and retrieval, but we chose Phonemail because it offered us all the features we needed, and it tied in well with our existing IBM computer systems," Keith McCoy, CFI's director of traffic, said. "Also, Rolm was willing to work with us closely as we determined both our present and future needs.

For its line size, CFI has one of the most sophisticated telephone systems in the country. Besides Phonemail, the Rolm CBX also offers route optimization, which automatically selects the most efficient call routing among the common carriers available, and In-Site, which records who sent and received calls, on what truck and how long they lasted.

"Rolm was priced in the upper-middle range of the vendors we looked at. But it was able to offer so much more in the way of technological advances and a state-of-the-art system. We like Rolm's products, and we like the idea of doing business with a progressive telecommunications company."

The Phonemail system operates via an applications processor linked to a Rolm CBX. Phonemail is able to digitize and compress analog speech and store it on hard disks that can hold up to 154M bytes of data. After the system digitizes the messages and stores them in a file, it places notification of the waiting messages in the users' voice "mailboxes."

CFI is the first trucking company in the U.S. to use Phonemail. News within the industry travels fast, and the system so far is generating interest and calls for details from other carriers nationwide.

CFI continues to find new applications for Phonemail within its operations. One of the most immediately cost-effective uses has been in the traffic department, where the system handles more than 40% of the department's 4,000 daily calls. McCoy estimated that soon Phonemail will take care of about half of these calls.

Direct calls between drivers and dispatchers average around three minutes a call; Phonemail calls average around 45 seconds. Besides reducing phone bills by 15% to 20%, the shorter calls also leave the lines free so dispatchers can handle the kinds of problems Phonemail cannot solve — those that require simultaneous conversation between the two parties.

For its line size (70 lines), CFI has one of the most sophisticated telephone systems in the country. Besides Phonemail, the Rolm CBX also offers route optimization, which automatically selects the most efficient call routing among the various common carriers available, and In-Site, which records who sent and received calls, on what truck, how long they lasted and so on. These two features, which augment Phonemail's operation, have already begun directly reducing phone bills.

The traffic department's local phone bill dropped from $4,800, one month before route optimization, to $2,200 the month after route optimization. With 50 ways to route a call across the country, it is difficult for individuals to know all the tariffs and choose the most cost-effective route. Route optimization takes care of these decisions automatically.

In-Site's cost contributions have been more subtle, but important nonetheless. The system can keep track, in detail, of individual efficiency in telephone use. It can monitor who uses Phonemail and how often. This knowledge lets CFI put the responsibility for efficiency and cost

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NAME__________
TITLE__________
COMPANY__________
ADDRESS__________
CITY______ STATE___ ZIP____
PHONE__________
Protocols currently used (including lookalikes)
☐ IBM 3270 ☐ SDLC
☐ Burroughs Poll/Select
☐ X.25 ☐ Other________
Number of remote locations______
Geographic Scope
☐ National ☐ Regional ☐ Local

RCA Cylix Communications Network
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Memphis, TN 38119, 901-683-3043

reductions, where necessary, with individual department managers.

Phonemail has made big improvements in the effectiveness of the marketing department. Patrick Turner, CFI's vice-president of marketing, heads a sales and marketing force of eight people who travel constantly nationwide. They cross time zones, get caught in meetings and need answers to questions, whether or not their requests fall within business hours. Phonemail allows them to exchange information with each other faster, without frustrating telephone tag.

Turner explained, "This enables us to make decisions quicker and react to customers' needs, which is automatically cost-effective. We can decide on a plan of action without any delay.

> ***A little personalized training will make a driver comfortable using the technology. But for the few hard-core holdouts: 'We just hope that they will accept it over time,' McCoy said.***

"Communication between marketing personnel is 35% of the game in the trucking business. We have an edge on our competitors because we can communicate with each other better than anyone else," Turner said. "In addition, I can disseminate information at one time instead of repeating it to each marketing manager. As we grow bigger and my span of control grows, this will become even more important. It is true for us that time is money."

Before Phonemail, the traveling field representatives often took two days to reach each other with important information. Now, the representatives can leave detailed messages in appropriate Phonemail boxes, receive and answer the messages in their own voices and act on the information even if they cannot get to the phone at the same time.

"From an internal standpoint, I am very high on Phonemail," Turner said.

As with anything new, especially something high-tech, Phonemail hit some rough patches initially. There were some problems with the dial tone that caused some frustrations early on, but those bugs have been worked out.

Turner estimated that it took his sales force about two days to adapt to Phonemail before it began to use it and depend on it.

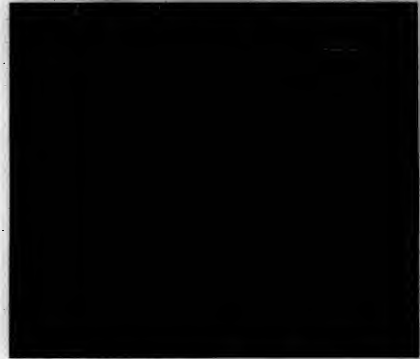
Phonemail has encountered some resistance from a few of the drivers who do not like the idea of talking to any kind of machine under any conditions. Because the company's managers can tell who uses Phonemail and who does not, they can isolate the drivers avoiding it and talk to them privately.

In some cases, a little personalized training will make a driver comfortable using the technology. But for the few hard-core holdouts, "We just hope that they will accept it over time," McCoy said. "If not, then our dispatchers can handle their calls in person without too much additional burden."

Most of the 520 Phonemail users at CFI are drivers. Most of them find they are able to spend less time trying to get through to dispatchers to give status reports, listen to safety messages and receive notification of any changes in their pickup or delivery schedules.

Another bonus is that families can use Phonemail to keep in touch with drivers when they are on the road. Families no longer need to leave messages with dispatchers or tie up the more expensive Wats

Front-end back-up switching?



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lines as they previously had to do. Family members can now leave messages as detailed or as personal as they like. In addition, the company's managers are relieved that the dispatchers no longer need to spend the company's time handling communication between drivers and their families.

For CFI, efficient exchange of information is considered a necessity, not a luxury. 'We are not the lowest priced carrier in the business,' Lacy said. 'What we sell is service, and the quality of our service is what distinguishes us from the others.'

Another department that has already made good use of Phonemail is loss prevention and safety, which is under the direction of Mike Schwarting. The department is responsible for training drivers as well as alerting them to unusual conditions they may encounter or reminding them about specific safety precautions.

In the past, Schwarting would send a message via computer terminal screen to the dispatchers, who would then have to remember to pass it on to the drivers as each driver called in as required.

"The drivers may or may not have received the message, and some of the messages may have been important for loss prevention," Schwarting said. "Now, I can leave a message in Phonemail with as much detail as I like and distribute it at once to every driver's Phonemail box. I can send them all with a return receipt, so I know if the message has been received."

Schwarting said that innovations such as Phonemail were the reasons CFI was awarded the 1984 grand prize for safety from the Interstate Carriers Conference of the American Trucking Association. The award is given to the firm with the best all-around safety program.

One early positive experience with Phonemail stands out in Lacy's mind. Soon after Phonemail was installed, Lacy was going to dinner with a customer in Tulsa, Okla. The customer asked a question for which Lacy did not have a ready answer, but he knew that Turner, who was in Minneapolis at the time, had the answer.

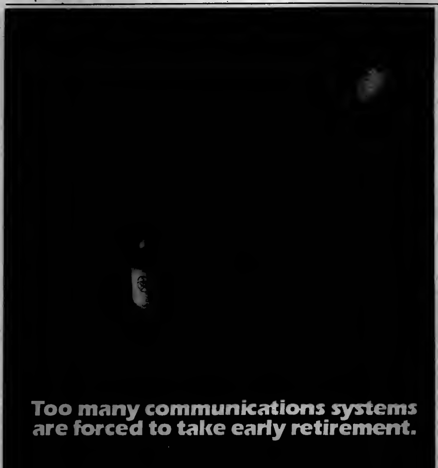
Lacy left a message in Turner's Phonemail box detailing the information he needed. A while later, Turner called his Phonemail box to get his messages, received Lacy's query and left the answer in Lacy's mailbox.

After dinner, Lacy called into the system, listened to Turner's information and was able to give the customer the answers he needed on the spot. Needless to say, the customer was impressed.

For CFI, efficient exchange of information is considered a necessity, not a luxury. "We are not the lowest priced carrier in the business," Lacy said. "What we sell is service, and the quality of our service is what distinguishes us from the others.

"CFI is in the top 2% in the country in both fastest-growing and most profitable trucking companies," he said. "We want to have the profile of a leader in the industry. In the future, we want to be on the leading edge of technology."

And being the first trucking company to adopt Phonemail is an example of CFI's attitudes and goals, Lacy explained. ■


Too many communications systems are forced to take early retirement.

PRODUCTS

Nestar Gateway Tool Allows IBM Micro to Emulate 3274

Nestar Systems, Inc. has announced IBM Systems Network Architecture (SNA) gateway software for its Program Language Analyzer (Plan) of personal computer networking systems. The software reportedly allows a dedicated IBM Personal Computer on a Plan network to emulate a remote IBM 3274 cluster controller that supports as many as 16 user stations per gateway.

IBM Personal Computers running IBM's DOS 2.0 or 2.1 and emulating IBM 3278s and 3279s qualify as user stations. The gateway station interfaces with IBM mainframes supporting 3270 SNA protocols, allowing other IBM Personal Computers to function as interactive stations.

Features emulated by the software include upper- and lowercase display, 24-row by 80-column screen with a 25th statua line, protected and unprotected fields and color display. Screen contents may be printed on a shared or local printer emulating IBM 3277, 3278 or 3279 printers. Synchronous Data Link Control (SDLC) line discipline up to 9,600 bit/sec is supported via leased lines.

Hardware requirements for the gateway include an IBM Personal Computer with 256K bytes of memory, an IBM SDLC card, a Nestar Plan Network Interface Card and an appropriate modem connected to a communications line or host locally attached via modem eliminator. The user stations require an IBM Personal Computer with 196K bytes of memory and a Nestar Plan Network Interface Card.

Nestar'a IBM SNA gateway software costs $3,000 for the cluster emulator and $200 for each workstation.

Nestar Systems, Inc., 2585 E. Bayshore, Palo Alto, Calif. 94303.

Artel Modem Compatible With VAX

Artel Communications Corp. announced a high-speed fiber-optic modem compatible with Digital Equipment Corp.'s VAX and PDP-11 minicomputers and DEC-compatible peripheral devices.

The DC100 reportedly permits long-distance interconnection of DR11-W and DR11-B communications interfaces, using a small duplex fiber-optic cable.

It is comprised of two modems: the DC100/C, at the central processor, and the DC100/U, at the user's location. Each modem is equipped with remote loopback diagnostics, according to the vendor. DEC-standard DR11 cables reportedly plug directly into the modema, which are interconnected via a fiber cable.

The price for the fiber-optic interface is $2,500 per end.

Artel Communications Corp., P.O. Box 100, West Side Station, Worcester, Mass. 01602.

AT&T Unwraps Dataphone Modem

AT&T Information Systems announced its new series of Dataphone 2224 full-duplex modems.

According to the vendor, the system operates at three speeds — 300-, 1,200- and 2,400-bit/sec — and is compatible with the AT&T 100 series and 212AR modems, the vendor said.

The 2224 full-duplex modem reportedly offers customers dialing options such as progress tone detection, which monitors calls to make sure connections are made. The modem can maintain in its memory a directory of preloaded, 36-digit telephone numbers and will automatically redial a number until a connection is completed.

The modem also contains circuitry that automatically detects and adjusts to the speed of the modem on the other end. It works with both synchronous and asynchronous terminals, operates with full- and half-duplex terminal devices and conforms to Consultative Committee on International Telephone and Telegraph standards.

The 2224 full-duplex modem performs end-to-end tests and local loopback, digital loopback and remote digital loopback tests. The modems connect via a standard modular voice and data jack and an RS-232-C interface cable.

The Dataphone 2224 full-duplex modem is available with multiple rack-mounting or as a stand-alone unit. The rack-mounted modem with autodial is priced at $1,265 and without autodial, $1,265. The stand-alone with autodial is priced at $1,265 and without autodial, $1,045.

AT&T Information Systems, 100 Southgate Pkwy., Morristown, N.J. 07960.

Network Gateway Out For Net/One System

Ungermann-Bass, Inc. has announced a network gateway that forms an interface between the Net/One local-area network communications system and a public data network via X.25.

The Net/One X.25 Gateway may be configured by the network administrator to interface either with a packet-mode host on Net/One or with a public data network. The system can be reconfigured if the user's needs change, according to the vendor.

The network gateway reportedly supports up to 32 virtual circuits with an X.25 link speed of up to 64K bit/sec. The physical interface is via RS-232-C, V.35 or RS-449 connections.

The interface is priced at $10,090 plus $2,500 per network for X.25 Gateway software.

Ungermann-Bass, Inc., 2560 Mission College Blvd., Santa Clara, Calif. 95050.

Ridge Unveils 32-Bit Workstation

Ridge Computers, Inc. has introduced a single-user, 32-bit workstation reportedly capable of executing up to 8 million instructions per second and 1.5 million Whetstone operations per second.

Called the Ridge 32S, the computer is said to offer OEMs, end users, systems houses and software development firms the power, speed and virtual memory of the largest 32-bit computers, but without the need for the special electrical power of air conditioning.

Fully software-compatible with its predecessor, the Ridge 32C, the 32S is a more compact system that has a reduced instruction set computer architecture and provides high-resolution graphics, according to the vendor.

The virtual memory system reportedly offers 4G bytes of addressable code and data, 1M to 4M bytes of memory, demand-paged virtual memory with 4K-byte pages and a memory cycle time of 375 nsec.

The basic configuration includes the Ridge 32 CPU, 1M byte of main memory, a 78M-byte Winchester disk drive and 1M-byte floppy disk drive. It also includes universal interfaces: two RS-232, one printer/plotter and one line printer port. It sells for $36,400.

Ridge Computers, Inc., 2451 Mission College Blvd., Santa Clara, Calif. 95054.

Ericsson Offers Tool

Ericsson Communications has introduced System 2500, a telecommunications support applications package for its business systems computer.

According to a vendor spokesman, System 2500 supports a full range of both voice and data functions and is capable of running multiple software applications simultaneously. The package offers distributed architecture processing and uses Cobol as its base criteria.

Its key applications are Champ, a call-accounting system, and Topas, an operator accounting system.

Champ enables companies to record telephone costs within their organization, while Topas acts as a computerized telephone directory and message service system that assists private branch exchange operators, according to the spokesman for the vendor.

Pricing for the System 2500 begins at approximately $30,000.

Ericsson Communications, 7465 Lampson Ave., Garden Grove, Calif. 92641.

Nationwide Digital Network Debuts

Dama Telecommunications Corp. has announced Damanet, a nationwide digital telecommunications system for businesses. Damanet reportedly integrates premises-based voice and data services for high-speed transmission via the company's national network. Damanet furnishes and manages the entire system.

Damanet facilities have been established in the Philadelphia and Washington, D.C. metropolitan areas. The system will reportedly be available in New York; Hartford, Conn.; Minneapolis; St. Paul, Minn.; Detroit and San Jose, Calif. by the close of the year.

The system links Damanet'a proprietary digital processor to a network that combines full-mesh, satellite time-division, multiple-access technology with local-distribution alternatives, including digital termination systems, institutional two-way cable and DS-1 channels. Damanet furnishes these facilities for interface with user telephones, computers, facsimile and video teleconferencing services.

Damanet provides fully switched point-to-point voice and wideband data services on a call-by-call basis. According to the vendor, Damanet customers will pay only for channel capacity selected and actual connection time.

Standard voice service includes optional data-conditioned voice channels for in-band data transmission at 9.6K bit/sec. User-selectable data rates range from 2.4K bit/sec to 512K bit/sec.

Value-added service options include channel-by-channel bit error protection on data channels and the use of a customer network access console that is said to enable users to obtain network status reports and monitor port-connection control and connectivity schedules.

Voice rates, billed in 6-second increments, will average between 20 cents and 30 cents per min. Data rates ranging from 2.4K bit/sec to 512K bit/sec, also calculated in 6-second increments, will be billed according to the bit rate selected. Rates for data transmission will range from 10 cents to 19 cents per min for 2.4K bit/sec, to almost $15 per min for 512K bit/sec, with some rate variations based on distance and the volume of system usage.

Dama Telecommunications Corp., 169 Johnson Road, Parsippany, N.J. 07054.

Interlan Unleashes Transceiver Said to Connect With Ethernet, Comply With IEEE 802

Interlan, Inc. has introduced an Ethernet transceiver that reportedly complies with the IEEE 802.3 local-area network standard. The NT100 is said to feature a nonintrusive cable tap that permits nodes to be attached or removed from an active network without disturbing network communications.

It can send and receive 10M-bit/sec bit streams, detect collisions and provide electrical isolation between the coaxial cable and the stations, according to the vendor. The unit reportedly includes built-in diagnostic features that protect the network from faulty operation of the transceiver itself or of a device attached to the transceiver, according to the vendor.

The NT100 is said to connect to Ethernet using a tap mechanism that eliminates the need to cut the cable each time a node is added to the network. It is also said to have a loopback feature and a heartbeat self-diagnostic function that tests the collision detection circuitry at the end of each transmission. Two additional methods of cable connection are available at no extra charge. The NT100 can be equipped with standard N-type connectors or, for networks using RG-58 thin cable, with British naval connectors, according to the vendor.

The NT100 is priced at $250.

Interlan, Inc., 3 Lyberty Way, Westford, Mass. 01886.

Macintosh Said To Ripen With IBM Link

Winterhalter, Inc. has announced a micro-to-mainframe link for the Apple Computer, Inc. Macintosh microcomputer. The Datatalker/MAC, an intelligent front-end processor, reportedly allows the Apple Macintosh to connect to local or remote IBM mainframes.

The Datatalker/MAC allows the Apple Macintosh to emulate the IBM 3275; the 3271 and 3277; the 3274 and 3278 and the 3276 and 3278 interactive terminal systems when connecting to IBM mainframes remotely, via modems or locally with modem eliminators or limited-distance modems. The protocol is bisynchronous.

Datatalker/MAC's features include an audible alarm, control unit, device addresses, user-modifiable transmission parameters and selectable Ascii or Ebcdic transmission code. Terminal characteristics include a display of 1,920 characters in 24 lines and the screen display of IBM 3270 status indicators. The terminal also supports all IBM 3270 terminal series function keys.

The unit's communications features include data transfer rates of up to 9,600 bit/sec, either half- or full-duplex communications, multidrop or point-to-point network links and a synchronous RS-232-C interface.

The Datatalker/MAC costs $1,095 and includes IBM 3270 emulation software on diskette, cable interface as well as a users' guide.

Winterhalter, Inc., 3853 Research Park Drive, Ann Arbor, Mich. 48106.

Course Said to Pay Off in Net Analysis

A short course in telephone voice engineering, which is designed to help both technical and nontechnical telecommunications managers, has been announced by Milton Gussow & Associates.
ly helps managers analyze their networks for cost reduction, improved grade of service or both. According to the vendor, someone with an understanding of AT&T's Wats and other long-distance offerings can evaluate and design cost-effective networks using the tutorial.

The program, written for the IBM Personal Computer, can simulate busy-hour traffic volumes of up to 85 hours, or 3,060 hundred call seconds, to a single group of up to 100 or more trunks as well as evaluate a single Wats or private line.

The program also contains a method for determining a trunk group's busy hour by simulating the dynamics of the carried traffic in relation to the trunks.

According to the vendor, all current Wats and voice private-line tariff costs are built into the program to simplify evaluations. Managers who submit their geographic call distribution with an order will get a free network demonstration analysis.

The price of the program is listed at $500.

Milton Gussow & Associates, 6619 N. Range Line Road, Glendale, Wis. 52209.

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1 Cx-Link software — the cost-effective way for your PC to talk to anything. ANSI 3.64 emulation lets your PC access the minis, protocol converters, and service bureaus that plug-in 3270 boards can't reach.
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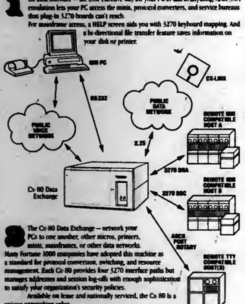

2 The Cx-80 Data Exchange — network your PCs to one another, other micros, printers, minis, mainframes, or other data networks.
Many Fortune 1000 companies have adopted this machine as a standard for protocol conversion, switching, and resource management. Each Cx-80 provides four 3270 interface paths but manages addresses and session log-offs with enough sophistication to satisfy your organization's security policies.
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HOUSTON SALES OFFICE: William J. Healey, **Western Regional Director.** William Mahoney, **District Manager.** COMPUTERWORLD, 8401 Westheimer, Suite 110, Houston, TX 77063, (713) 952-1220.

DCA Unveils Unibus Interface

Digital Communications Associates, Inc. (DCA) has unveiled a Digital Equipment Corp. Unibus interface network processor that reportedly emulates the asynchronous controller operation of the DEC DMF-32 VAX communications interface, including both the character and direct-memory access mode output capabilities.

The System 207 is said to function with DCA equipment to support a cluster of remotely located terminal users. Users can establish direct host-to-host connections between computers by placing a System 207 on the Unibus of each computer.

The System 207's standard features include an operator's console port that is said to allow operators to monitor the system's performance and to change the system's configuration. By connecting a terminal to this port, the system operator can receive system status reports on request.

Prices for the System 207 begin at $4,950.

Digital Communications Associates, Inc., 303 Technology Park, Norcross, Ga. 30092.

NCR Comten Upgrades Modems

NCR Comten, Inc. introduced five features for its 7160 series of Systems Network Architecture-compatible diagnostic modems: extended diagnostics, switched network backup, fanout, tail circuit and data multiplexing.

Extended diagnostics expand users' diagnostic capabilities with two remote modem tests: remote power loss indication and special tone test.

Switched network backup provides users with backup communications between dedicated-line modems if the dedicated line fails. The fanout feature enables users to connect up to four remote data terminal equipment units to one remote modem. The equipment can simultaneously receive data, but only one unit can transmit at a time.

The tail circuit feature connects two remote modems, and the data multiplexing feature permits users to attach remote data terminal units of 2,400 bit/sec or 4,800 bit/sec, or both, to a remote modem, allowing multiple subchannels to share one communications line.

Features may be purchased or leased. Extended diagnostics cost $290; switched network backup, $340; fanout, $750; tail circuit, $50; and data multiplexing, $870.

NCR Comten, Inc., 2700 Snelling Ave. N., St. Paul, Minn. 55113.

Compugraphic Link Out for IBM Micro

A hardware and software package that reportedly permits communications and media compatibility between IBM Personal Computers and compatibles and Compugraphic Corp.'s Modular Composition Systems (MCS) was recently announced by G.O. Graphics, Inc.

The Horizon MCS Conversion System's features allow it to convert word processing data disks directly to MCS format on a Personal Computer in seconds; convert MCS disks to DOS-compatible files; provide bidirectional communications supporting asynchronous and synchronous protocols; and provide the versatility to select from thousands of applications programs designed for IBM computers.

The package, consisting of a master program disk, an IBM Personal Computer-compatible computer card and users' guide, costs $2,950.

G.O. Graphics, Inc., 18 Ray Ave., Burlington, Mass. 01803.

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PRODUCTS

Bridge Unwraps Network Tools

Bridge Communications, Inc., has announced a family of diskless communications servers, a file server and a multiplexer software package.

The diskless Xerox Corp. Ethernet communications servers, the CS/1-X and the CS/100-X, are reportedly designed to connect diverse computing devices and users via Ethernet in environments where floppy disks risk contamination or where user access to each unit is undesirable.

Pricing ranges from $3,600 to $9,600, depending on the number of ports.

The NCS/100 Network Control Server sends operating system software, configuration files, resource names and utility programs to the communications servers via Ethernet. On its 1M-byte floppy disk drive, the NCS/100 maintains command files, network statistics and usage information for each node connected to it on a Unix-like file system. The NCS/100 costs $4,900.

SPMUX, the multiplexer package, allows the Bridge CS/1-BSC communications server to link Sperry Corp. Uniscope display terminals to Sperry host computers via an Ethernet local-area network.

It is available as an option to the standard CS/1-BSC, which provides Ethernet access to devices running character-synchronous protocols.

The SPMUX software package costs $1,000.

Bridge Communications, Inc., 1345 Shorebird Way, Mountain View, Calif. 94043.

Kinex Unveils Data Compressor

A stand-alone data compressor reportedly capable of compressing half-duplex byte-oriented binary synchronous communications protocols was introduced by Kinex Corp.

According to the vendor, the Comdec-1b offers throughput upgrade without replacement of existing private-line or dial-up modems. It also offers greater throughput or decreased bandwidth of synchronous devices on statistical multiplexers, increased throughput on digital links and security via coding algorithms.

Pricing for the Comdec-1b starts at $1,500.

Kinex Corp., 6950 Bryan Dairy Road, Largo, Fla. 33543.

Omnidrive Bows

Corvus Systems, Inc. announced a single-user version of the Omnidrive 5¼-in. Winchester disk storage system for Apple Computer, Inc.'s Macintosh personal computer.

Omnidrive is also available for a variety of personal computers, according to a spokeman for the vendor.

Pricing for the Macintosh version ranges from $1,795 to $4,995, depending on capacity.

Corvus Systems, Inc., 2100 Corvus Drive, San Jose, Calif. 95124.

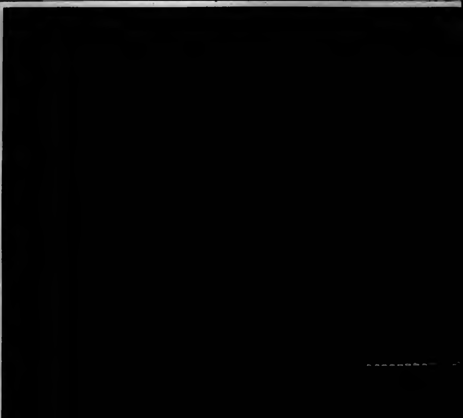
Televerter Offers Code Conversion

An asynchronous converter designed to provide speed, code and electrical interface conversion between dissimilar data communications protocols was announced by VTI Digital Systems, a division of Video Tek, Inc.

The Model T-2084 Televerter may be physically configured for direct distance dialing, CCITT V.24, RS-232, current loop or parallel digital operation, according to a spokesman for the vendor.

The price of the Model T-2084 Televerter is listed at $650.

VTI Digital Systems, 199 Pomeroy Road, Parsippany, N.J. 07054.



CALENDAR

SEPT. 10-11, DALLAS — *Data Communications: An Introduction to Nontechnical Management.* Contact: Data Communications, Special Projects Conference Management Center, c/o Information Breakthroughs, Inc., 445 W. Main St., Wyckoff, N.J. 07481.

SEPT. 13-14, WASHINGTON, D.C. — *Regional Bell Operating Company to Cable MSO: It's Time We Talked!* Contact: Telestrategies, Inc., 6842 Elm St., Suite 102, McLean, Va. 22101.

SEPT. 13-14, BOSTON — *Troubleshooting the Data Communications Network.* Also, Sept. 20-21, Colorado Springs, Colo.; Sept. 27-28, San Jose, Calif. Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

SEPT. 17-20, PHILADELPHIA — *Managing With Micros.* Also, Sept. 24-27, Houston. Contact: USPDI, Managing With Micros, Dept. KLM, 1620 Elton Road, Silver Spring, Md. 20903.

SEPT. 19-21, PHILADELPHIA — *New Generation PBX: The Path To Voice-Data Integration.* Also, Sept. 24-26, Hartford, Conn. Contact: Data-Tech Institute, 386 Franklin Ave., P.O. Box 569, Nutley, N.J. 07110.

SEPT. 24-25, NEW YORK — *Local-Area Network/PBX Evaluation: A Planning and Decision-Making Perspective.* Contact: Data Communications, Special Projects Conference Management Center, c/o Information Breakthroughs, Inc., 445 W. Main St., Wyckoff, N.J. 07481.

SEPT. 24-25, WASHINGTON, D.C. — *Managing Systems Projects.* Also, Oct. 1-2, New York. Contact: New York University, School of Continuing Education, Seminar Center, 575 Madison Ave., New York, N.Y. 10022.

SEPT. 24-26, LOS ANGELES — *Network Design: Methods for Designing Effective Data Networks.* Contact: Systems Technology Forum, Inc., 9000 Fern Park Drive, Burke, Va. 22015.

SEPT. 26-28, ORLANDO, FLA. — *X.25 and Companion Standards for Packet Network Applications.* Contact: Omnicom, Inc., 501 Church St. N.E., Suite 206, Vienna, Va. 22180.

SEPT. 27, WASHINGTON, D.C. — *Voice-Data Integration: Issues and Answers.* Also, Oct. 12, Minneapolis. Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

OCT. 1-2, SAN DIEGO — *X.25 and Public Packet-Switched Networks.* Contact: Data Communications, Special Projects Conference Management Center, c/o Information Breakthroughs, Inc., 445 W. Main St., Wyckoff, N.J. 07481.

OCT. 1-2, CHICAGO — *Telecommunications I: An Introduction to Voice Communications.* Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

OCT. 1-2, SCHAUMBURG, ILL. — *The Engineer as Manager.* Contact: Society of Manufacturing Engineers, 1 SME Drive, P.O. Box 930, Dearborn, Mich. 48121.

OCT. 1-3, ORLANDO, FLA. — *802 Local-Area Network Standards and Technology.* Contact: Omnicom, Inc., 501 Church St. N.E., Suite 206, Vienna, Va. 22180.

OCT. 1-5, WASHINGTON, D.C. — *Communications Satellite Engineering.* Contact: Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

OCT. 22-24, BOSTON — *Data Communications Concepts and Systems.* Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

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EXIT

Foster Hinshaw's hard disk failure nightmare came true.

Foster Hinshaw, vice-president of Stone Associates, Somerville, Mass., was pushed to his limit trying to achieve a workable solution for his nonworking personal computer.

My company bought an IBM-compatible personal computer in July 1983 for commercial billing. In the beginning, it worked well.

However, starting in December, it crashed about once a day. Once, we lost the directory of the hard disk — the proverbial hard disk failure that everyone has nightmares about.

The dealer could not help me, but the distributor could. The problem was that the dealer did not want me to call the distributor, for reasons unknown to me. Finally, he gave me the number and let me call.

The distributor let me call California. I talked to someone there who gave me some shreds of information. I spent three days trying to figure out how the directory was made. I recovered the files, but the machine kept crashing. The dealer said there must be a problem with the power lines.

One Sunday morning in February, I arrived at the room to the odor of burnt components. Being a hardware designer, I opened the box and found that the hard disk controller board had fried.

I had to go deal with the reluctant dealer again. The poor guy was not really to blame because he was under orders to keep customers away from the distributor. Anyway, he took my melted computer to a repair technician with the distributor. I could not come.

They gave me a new power spine and a new hard disk controller — along with a bill for $2,100. I said they should pick up the tab.

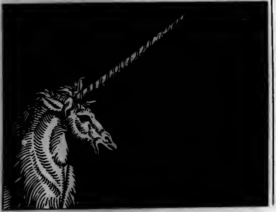
The dealer said, "Look, if you had told me that you would be using this in a commercial application, I would never have recommended this machine because it is not a commercial machine." I told him I thought he was full of it.

The end result was that they would fix it for $400 if I signed a maintenance contract for another $400. I paid.

Six weeks later, the machine acted up again, and the distributor could not find any problem.

I drove out to the distributor and arrived at his door, machine in hand. "This is the machine you cannot find a problem with," I said. " It is not working. Thursday night, after fifteen minutes, the thing crashed again." He took it out to his cold warehouse, opened up the cover and ran a test routine and it would not crash. I was amazed that he was so naive that he would try to fix a machine that had a heat problem by opening it up in a cold warehouse. So I put the cover back on and covered up the air holes and turned it on.

After a while, it crashed. And it kept crashing. I was delighted; the repairman was not. Had I not been standing over his head, he never would have fixed it.



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